A2075-17 F

BASIC SKILLS

An American Management Association Research Report on TESTING AND TRAINING

AMA Research Reports

Eric Rolfe Greenberg, Editor
Jerry Beilinson, Editorial Associate

Contributors: Karl Haigler
David Harman, Ed. D.
Diane Kangisser

For HRD Department, Inc.:

Brian Murphy
Susan Peterson

Library of Congress Cataloging-in-Publication Data

Basic skills : an American Management Association research report on testing and training / Eric Rolfe Greenberg, editor ; Jerry Bellinson, editorial associate ; contributors, Karl Haigler ... [et al.].
p. cm. -- (AMA research reports)
ISBN 0-8144-3521-1 : $35.00 ($31.50 to members)
1. Employer-supported education--United States. 2. Employment tests--United States. 3. Occupational aptitude tests--United States. 4. Reading (Adult education)--United States. 5. Literacy--United States. I. Greenberg, Eric Rolfe. II. Haigler, Karl. III. American Management Association. IV. Series.
HF5549.5.T75B95 1989
331.25'92--dc20 89-48415
CIP

© 1989 American Management Association, New York, New York

All rights reserved. Printed in the United States of America.

This publication may not be reproduced, stored in a retrieval system, or transmitted in whole or in part, in any form or by any means electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of AMA Research Reports, American Management Association, 135 West 50th Street, New York, New York 10020.

First printing

ISBN 0-8144-3521-0

Price: $35.00/$31.50 to AMA Members

Contents

	Introduction	5
1.	Testing and Training: The AMA Survey	8
2.	Evaluating the Need	21
3.	Addressing the Need	38
4.	Organizing the Response	52
	Afterword	68
	Appendix: Tables	72

Introduction

> *"Reeling and Writhing, of course, to begin with," the Mock Turtle replied, "and the different branches of Arithmetic — Ambition, Distraction, Uglification, and Derision."*

How many people in today's workforce can read this classic piece by Lewis Carroll?

A quick answer: Not enough. Not enough, at any rate, to meet future needs in an economy based on high-tech manufacturing jobs and service-sector requirements for "knowledge workers."

A rush of business and academic studies warn of a decline in basic reading and writing skills, and in the ability to perform simple mathematical calculations. Consider these facts:

- There are 27 million functionally illiterate adults in the nation — 15 percent of the adult population. Additional millions with elementary reading skills are unable to learn job skills from manuals or instructional materials.
- The Educational Testing Service reported in 1988 that fewer than half the nation's 17-year-old high school students could figure the area of a rectangle, or knew that "87 percent of 10" was *less* than 10.
- *Workforce 2000*, a 1987 study from the Indianapolis-based Hudson Institute, predicted that by the end of the century, a bare 10 percent of the entering workforce will be able to solve for *x* in a simple algebraic equation.

But why worry? Won't 21st-century machines operate on their own, in unpeopled factories? Not at all, say the experts. In fact, the work of the future will increasingly depend upon the ability to receive, understand, and act upon *written information*. More jobs, especially

in the growing service industries, will require high levels of reading skills and greater facility with numbers.

Caught in this bind, American corporations face two tasks: measuring the basic reading, writing, and math skills of their workers, and offering remedial training to those who lack such skills.

Large Problem, Little Response

But a 1988–89 American Management Association survey of more than one thousand human resources managers found that only one-third of the companies polled engage in basic skills proficiency testing.

Certainly, basic skills testing is on the upswing: 40 percent of the firms that perform such testing initiated their programs in the past five years.

But training lags. Less than ten percent of the firms that test — less than three percent of the entire sample — require basic training in reading, writing, and arithmetic for workers whose tests reveal deficiencies.

Why so few? Most companies prefer not to deal with the problem. According to the AMA survey, better than eight out of every ten firms that test applicants in basic skills simply refuse to hire candidates who "flunk" the tests. One result: In 1987, the NYNEX Corporation (the "Baby Bell" that provides telephone service for New York and New England) had to test 57,000 applicants to fill 2,100 positions for operators and repair technicians — a ratio of 27 people tested to every one hired.

To lower that ratio, employers are left with two options:

- Increase salary levels at the lower echelons to attract more qualified applicants; or
- Hire available applicants with marginal reading and math skills, and train them — on company time and at company expense.

AMA has monitored developments in this area through the 1980s, highlighted by the publication of *Workplace Literacy*, an AMA Management Briefing, in 1983. We have found that organizations that opt to train workers in basic skills are invariably positive about the results. "Very successful," "outstanding," and "superb" were typical responses in telephone interviews performed by AMA researchers. Add to their testimony the fact that these programs are increasing their budgets and their scope, and the obvious conclusion is that remedial training

provides demonstrable benefits to the organization.

They are doing so in spite of the fact that the very word "remedial" carries negative connotations, especially among the workers most in need of such training. Euphemisms abound: "refresher" courses, "skills enhancement" programs, and "personal development" training are among the more popular. But the elements that ensure success lie in keying the courses to the particular job at hand, and in demonstrating that the training will enhance individual performance, and with it prospects for promotion and increased pay.

In this report, we offer the reader examples of remedial training programs that have carved out successful records in enhancing worker skills, resulting in increased productivity and sharply lower product rejection rates. We interviewed more than two dozen human resources managers with direct responsibility for such programs, and took a long, in-depth look at three leaders in the field: General Motors, Motorola, and the Onan Corporation.

We present encouragements and cautions from three recognized experts in adult education:

- Mr. Karl Haigler, former Director of the Adult Literacy Initiative of the U.S. Department of Education, and presently a special advisor to the Office for Literacy, Office of the Governor of Mississippi;
- Dr. David Harman, Director of the Institute for Corporate Education, headquartered in New York City; and
- Ms. Diane Kangisser, Director of the Literacy Services Division for MATRICES Consultants, a Connecticut-based consultancy and training organization.

We include a checklist for the human resources manager charged with designing and implementing a literacy training initiative, provided by Brian Murphy and Susan Peterson of the Minnesota-based HRD Department, Inc.

And to start, we offer a summary of the results of our extensive survey on workplace testing and training, conducted in 1988-89 by AMA Research Reports.

Workplace literacy is a problem that won't go away. On the contrary: the mismatch between the skills that workers *possess* and the skills they *need* to perform productively threatens America's competitive position in the world economy. While there are marginal alternatives to basic skills training (and they will be discussed), none can provide an effective substitute for the simple -- and basic -- ability to read, write, and calculate.

1

Testing and Training: The AMA Survey

Annually since 1986, the American Management Association has polled human resources managers on various forms of workplace testing. Initially, we concentrated on testing for the HIV virus — commonly and erroneously known as "AIDS testing" — and for illegal or controlled substances. More recently, we widened the scope of the survey to encompass polygraph testing, job competency testing, and, in our 1988–89 survey, testing for proficiency in reading, writing, and mathematics.

The questionnaire employed for this report was mailed in late 1988 to randomly selected human resources managers of AMA-member companies and subscribers to *Personnel*, AMA's monthly human resources periodical. We "closed the window" on responses in mid-January 1989, with 1,005 usable questionnaires in hand.

THE AMA SAMPLE

This self-selecting sample has a margin of error of plus or minus 3.2 percent. As is typical of an AMA poll of this size, nearly half the respondent organizations reported annual sales of under $50 million;

some 35 percent had sales of more than $50 million but less than $500 million; and the remaining 15 percent had sales in excess of $500 million. In our analysis, we use the terms "small," "midsized," and "large," respectively, to define these categories. (For nonprofit organizations, we substitute annual operating budget for annual sales.)

Thus constituted, this is not a scientific cross-section of American business (98 percent of American firms have less than $10 million in annual sales). But in terms of *workers*, the AMA sample comes somewhat closer to reflecting the nation's economy. Nearly one-third of American workers are employed by companies with annual sales in excess of $50 million.

A table of the AMA sample, broken out by sales and by seven key business categories, will be found in the Appendix (Table 1).

What We Found

In brief, these were our key findings on workplace testing and training in basic skills:

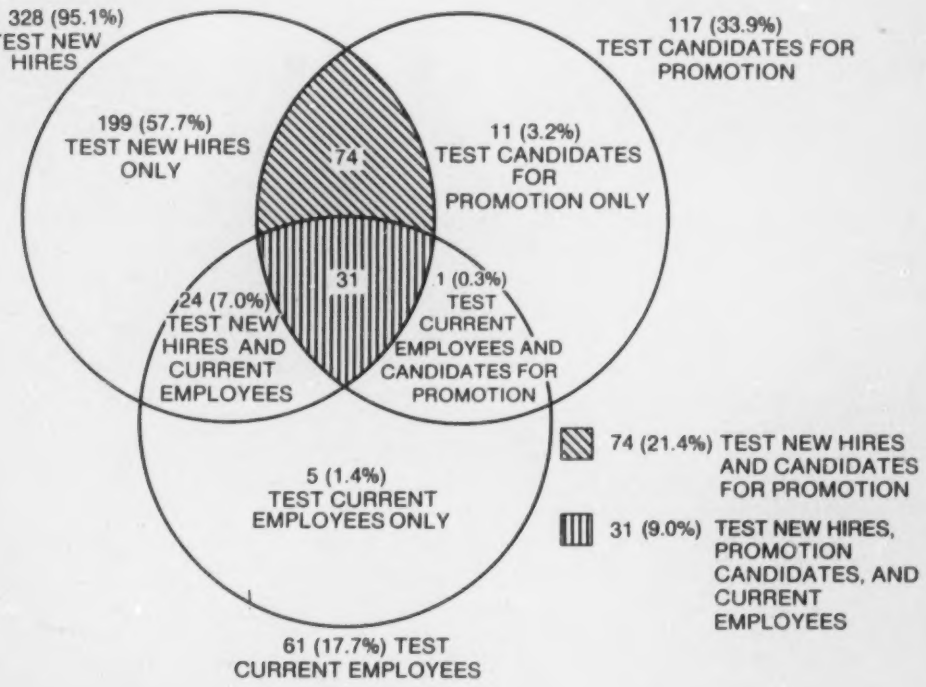
- Just over one-third of survey respondents perform some manner of testing for basic skills.
- Most of this testing focuses on job applicants. Thirty percent of companies that test for basic skills examine all new hires, and an additional 67.3 percent test selected new hires, mostly on the basis of job category. In comparison, just 17 percent of firms that test examine current employees, while 33 percent examine candidates for promotion.
- Job applicants who reveal deficiencies are not hired by 84 percent of respondent firms that test. A bare seven firms hire such applicants and refer them for remedial training.
- Of 61 firms that test current employees, 16, or 26 percent, require obligatory remedial training. Fifteen percent reassign the deficient employee. Seven percent dismiss the employee.
- Three-quarters of firms that test deny promotion to candidates who reveal deficiencies in basic skills.
- Basic skills testing is on the increase: 40 percent of firms that test began their programs in the past five years, and 72 percent began in the 1980s.
- The average cost of this testing in 1988 was $10,000, but that average is affected by three companies that spent more than $100,000 on testing programs. In contrast, 37 percent of respondents giving figures held testing expenses below $1,000, and another 16 percent spent less than $2,000.

Who Tests, Who is Tested

Of 1,005 companies polled, 345, or 34.3 percent, perform some sort of basic skills testing. We found little variation by organizational size. Thirty-seven percent of large firms reported basic skills testing, compared with 33 percent of both midsized and small companies.

The "mix-and-match" of policies in testing new hires, current employees, and/or candidates for promotion, also held fairly constant across organizational size. Exhibit 1 shows how companies that test for basic skills combine these policies.

OF 345 COMPANIES THAT TEST FOR BASIC SKILLS:



However, the numbers reveal significant variations by business category. Nearly half the respondents in banking, financial services, and insurance, combined as a single group, report basic skills testing, closely followed by government and military entities (44%). At the low end: health care and medical providers (24.5%) and educational institutions (26.8%).

Table 2 in the Appendix gives the full statistical data.

Testing New Hires. The questionnaire asked if respondents test *all* new hires, or test selectively; and if they test for reading and writing, for mathematical skills, or for both.

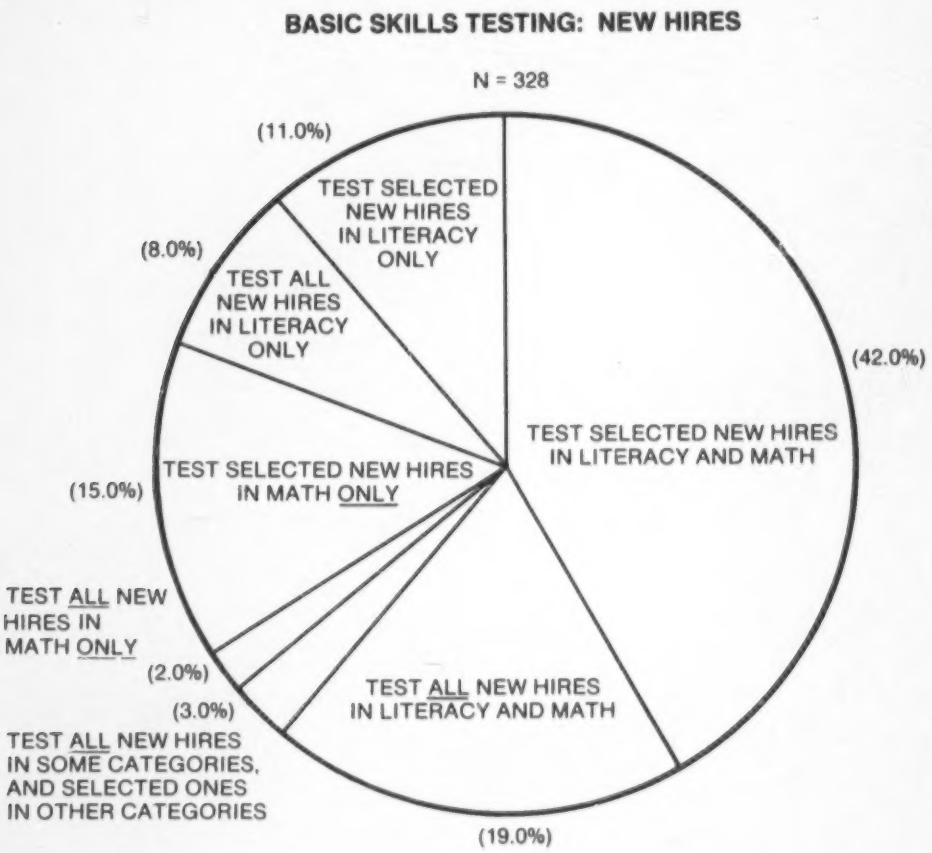

BASIC SKILLS TESTING: NEW HIRES
N = 328
(11.0%)
TEST SELECTED NEW HIRES IN LITERACY ONLY
(8.0%)
TEST ALL NEW HIRES IN LITERACY ONLY
(42.0%)
TEST SELECTED NEW HIRES IN LITERACY AND MATH
TEST SELECTED NEW HIRES IN MATH ONLY
(15.0%)
TEST ALL NEW HIRES IN MATH ONLY
(2.0%)
(3.0%)
TEST ALL NEW HIRES IN LITERACY AND MATH
TEST ALL NEW HIRES IN SOME CATEGORIES, AND SELECTED ONES IN OTHER CATEGORIES
(19.0%)

Exhibit 2 shows the results among the 328 companies that test new hires. These firms represent 32.6 percent of the whole sample, and 95 percent of those that do any testing.

Service providers lead manufacturers in testing job applicants. Virtually all the service companies that engage in testing examine new hires (99.1%). Of manufacturers that test, 77.8 percent examine new hires.

Testing Current Employees. Assuming that no organization tests *all* current employees on a random or ongoing basis, we asked if respondents test *selected* current employees for reading and writing, for math skills, or for both.

BASIC SKILLS TESTING: CURRENT EMPLOYEES

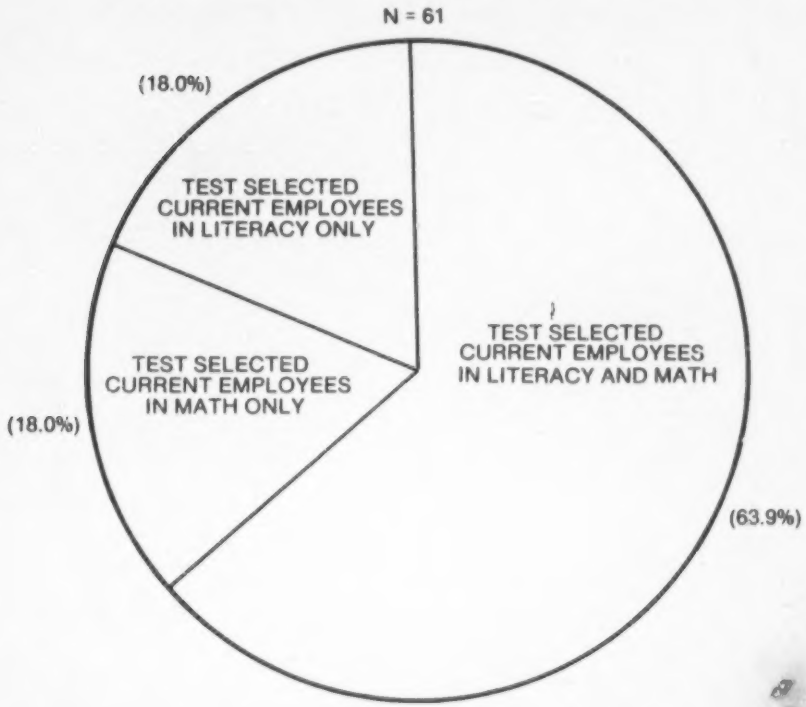

N = 61
(18.0%)
TEST SELECTED CURRENT EMPLOYEES IN LITERACY ONLY
TEST SELECTED CURRENT EMPLOYEES IN LITERACY AND MATH
TEST SELECTED CURRENT EMPLOYEES IN MATH ONLY
(18.0%)
(63.9%)

Exhibit 3 shows the results among 61 companies that test current employees. These firms represent 6.1 percent of the whole sample, and 17.7 percent of those that do any testing.

Among companies that test, health care and medical providers (25.9%) are most active in examining current employees, closely followed by manufacturers (21.6%). A bare five percent of educational institutions and 6.4 percent of professional service providers engaged in testing test current employees.

Testing Candidates for Promotion. We asked if such testing encompassed all promotional candidates, or if it was done selectively.

BASIC SKILLS TESTING: CANDIDATES FOR PROMOTION

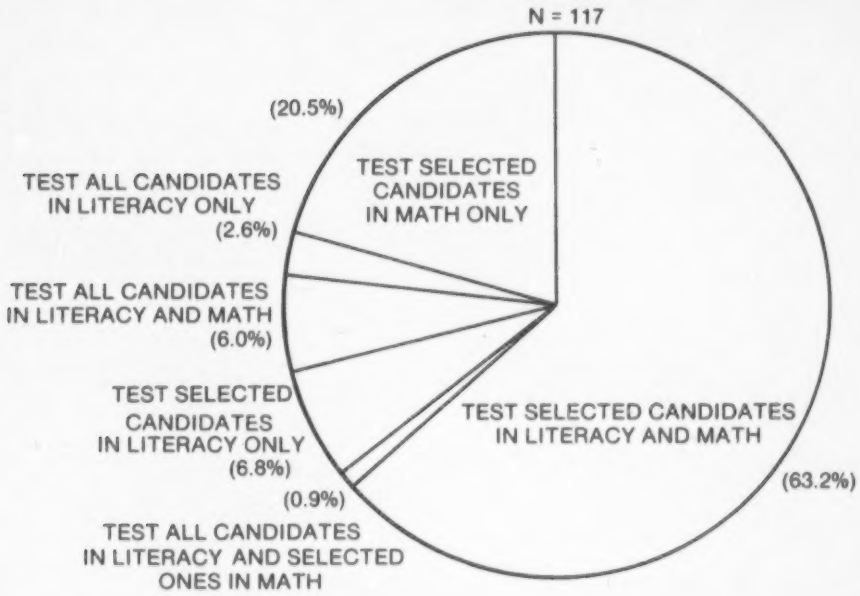

N = 117
(20.5%)
TEST SELECTED CANDIDATES IN MATH ONLY
TEST ALL CANDIDATES IN LITERACY ONLY (2.6%)
TEST ALL CANDIDATES IN LITERACY AND MATH (6.0%)
TEST SELECTED CANDIDATES IN LITERACY ONLY (6.8%)
(0.9%)
TEST ALL CANDIDATES IN LITERACY AND SELECTED ONES IN MATH
TEST SELECTED CANDIDATES IN LITERACY AND MATH
(63.2%)

Exhibit 4 shows the results among 117 companies that test candidates for promotion. These firms represent 10.6 percent of the whole sample, and 33.9 percent of those that do any testing.

Although educational institutions trail other categories in testing current employees and are in the middle range among those that test new hires, they are leaders in testing candidates for promotion. Faculty appointments figure greatly in the finding that more than half of the schools and universities in the sample test for promotion. Manufacturers (45%) and government and military units (41%) are also leaders. The latter category depends heavily on the results of civil service examinations and written tests to advance in rank.

Other notable findings:

- Where respondents test selectively, job category is almost always the basis for selection (94%). A scant 2.2 percent use management level as the selection criteria.
- Testing for math skills is as prevalent as testing for reading comprehension. Candidates for promotion are *more* likely to be tested in math than in reading. Among companies that test promotion candidates, 21 percent test *only* in math, compared with nine percent that test only in reading.

Judging by Results

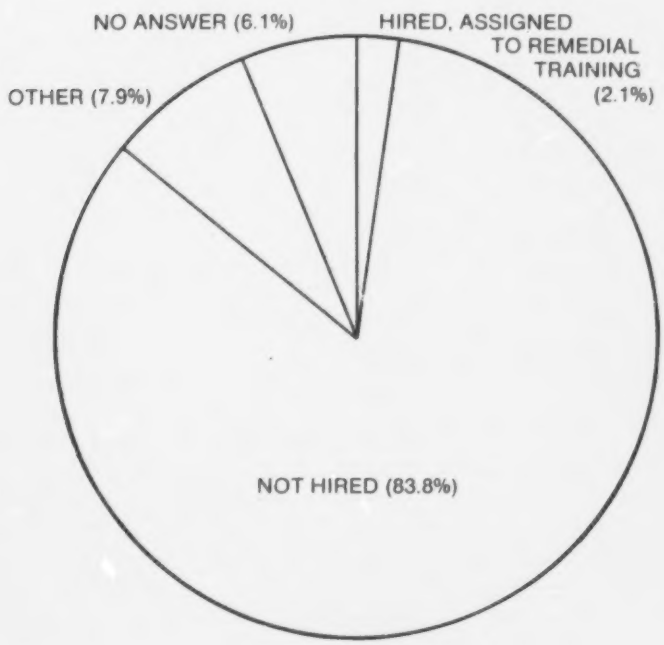
"If test results reveal deficiencies, what action do you take?" asked the AMA questionnaire. Naturally, responses differed regarding job applicants, current employees, and candidates for promotion.

We found important variations by organizational size. Most surprising: *small* and *midsized* organizations proved more likely than large firms to assign "deficient" workers and promotional candidates to obligatory remedial training. Further investigation discovered that the key word here was "obligatory." Respondents at large companies emphasized that remedial training was offered on a *voluntary* basis.

Table 3 in the Appendix offers the full statistical data.

Action on New Hires. The easiest and most popular course to follow, with job applicants who show deficiencies in basic skills is to refuse them employment. Exhibit 5 shows the responses among the 328 respondents that test new hires.

WHEN TESTING REVEALS DEFICIENCES:



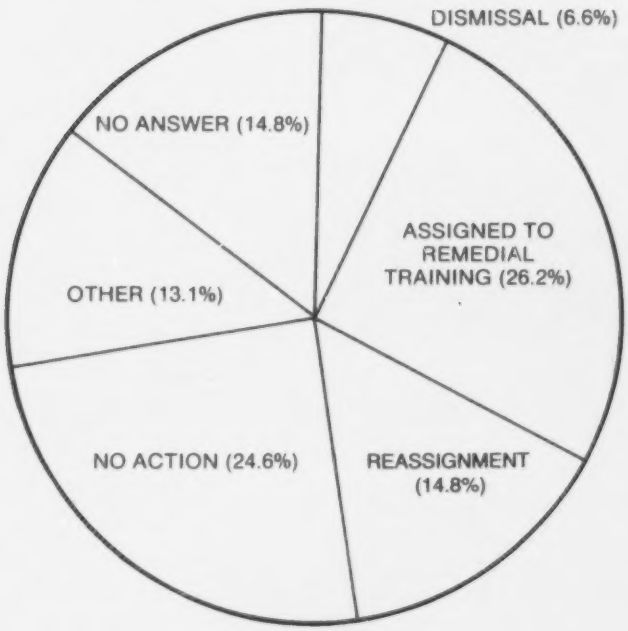
NEW HIRES
N = 328

The 26 respondents that wrote in "other" policies emphasized a case-by-case approach. Such comments as "depends on the severity of the problem," "evaluate with experience," and "other factors considered" were common. Half a dozen respondents indicated that they made special efforts to find appropriate jobs for applicants with basic skills deficiencies.

Government and military units (9.7%) rated highest among business categories in assigning new hires to remedial training. Our survey found *no* automatic remedial training for new hires among educational institutions and banking, financial, and insurance firms, and only one obligatory remedial program for applicants among 297 manufacturers. Again, the key word is "obligatory"; other firms in these categories offered voluntary programs.

Action on Current Employees. Just 61 firms in the sample test current employees; the margin of error in a sample of this size is ±12 percent. Therefore, the findings in this category are statistically uncertain. Exhibit 6 shows the responses in this category.

WHEN TESTING REVEALS DEFICIENCES:

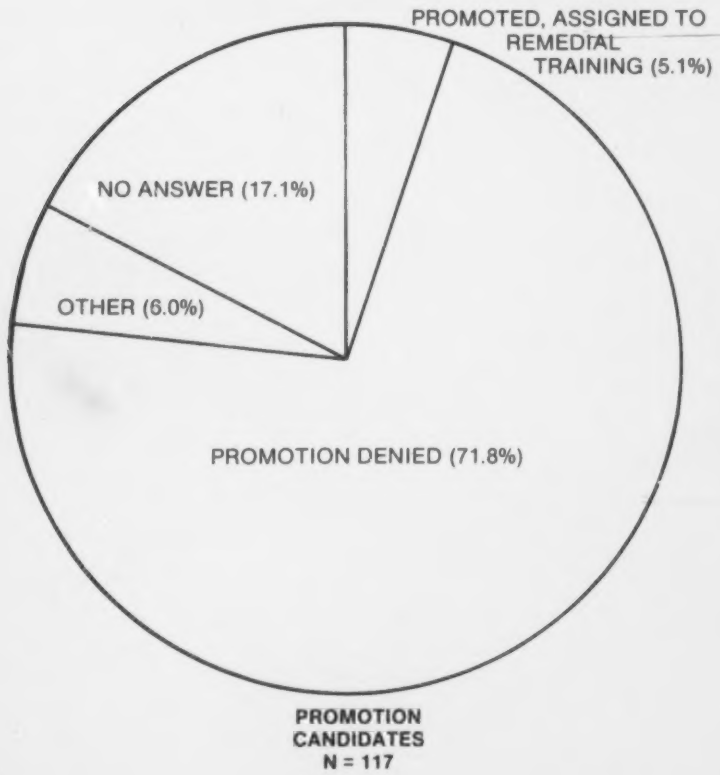


CURRENT EMPLOYEES
N = 61

The "no action" alternative means, of course, no *immediate* or *direct* action. Over the longer term, an employee's demonstrated deficiencies in basic skills have an important impact on his or her career track: promotion is less likely, merit increases less sure. Again, a *voluntary* enlistment in remedial training offers an alternative to a dead end.

Action on Candidates for Promotion. Exhibit 7 shows the results among the 117 respondents that test candidates for promotion.

WHEN TESTING REVEALS DEFICIENCES:



Although nearly three-quarters of the respondents that test promotion candidates answered "promotion denied," further investigation revealed that the matter is not so cut and dried. Many firms indicated that candidates are encouraged to seek remedial training on a voluntary basis, and are later retested for the new position.

Large firms tend to operate "by the book," while smaller ones are somewhat more inclined to deal with employees on a case-by-case basis. Among large firms, 81 percent automatically deny promotion to candidates whose tests reveal deficiencies; among midsized companies, the number drops to 67 percent.

Even where remedial training is voluntary, rather than obligatory, employees are hesitant to enroll. Many who need the training fear that they will be stigmatized by an open admission that they need help in these areas. Not all who fail such tests can be fairly termed "functional illiterates"; many people have problems taking tests *per se*, and cultural factors may be at work. Moreover, many who are indeed functionally illiterate have become expert in "faking it." Arthur Colby, president of Literacy Volunteers of America, states that "Illiterates become the greatest actors in the world." To enroll in remedial training is to drop the mask.

But the prospects of increased job security and opportunities for career advancement, combined with employer assurances that volunteers will not suffer negative consequences, help to overcome doubt. Once enrolled, trainees most often prove highly motivated and eager for learning.

Testing Instruments

Respondents reported a wide variety of test instruments, some developed in-house, some purchased from nationwide testing firms, and others especially adapted to the specific skills necessary to particular jobs. Sixty-six respondents -- 19 percent of those that test for basic skills -- gave answers, listing more than 50 different test instruments, some combining literacy and math, others exclusively devoted to a single area.

With so much variety, no single test (or test vendor) may claim market dominance. Here are the names of instruments listed by at least three different respondents, with the number of times each was cited. Even here, individual vendors offer different tests for different positions.

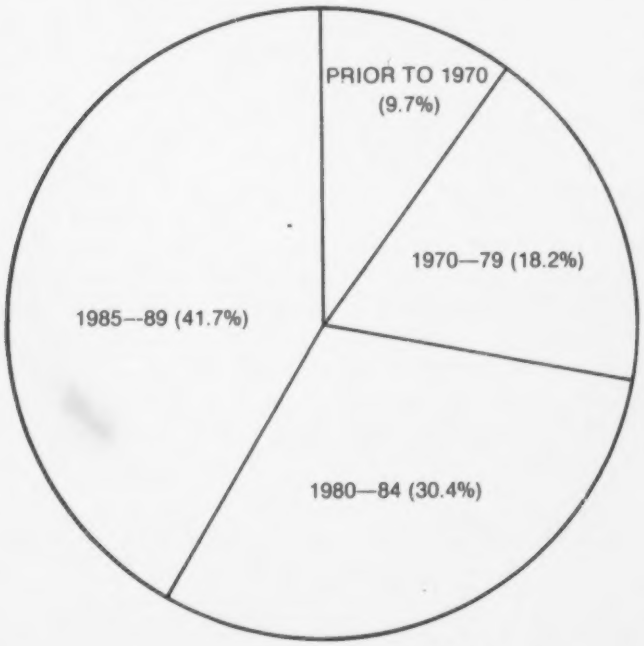
Reading	Writing	Math	
10	10	9	Civil Service Examinations (various)
4	3	4	General Aptitude Test Battery (GATB)
3	3	6	LOMA Job Effectiveness Prediction System
5	0	5	SRA
7	5	6	Wonderlic

As will be seen, experts urge using tests that have a high degree of specificity for a particular position in a particular organization. The more the test directly bears upon the job at hand, the better the result, and the greater the perceived "fairness" among those taking the exam.

How Long, How Much?

Most companies are newly arrived to the business of basic skills testing. The greater share has been testing for less than five years, and 72 percent of all testing programs came into being in the 1980s. Exhibit 8 shows the data from 247 respondents answering the question, "In what year was basic skills testing inaugurated?"

YEAR IN WHICH TESTING WAS INAUGURATED

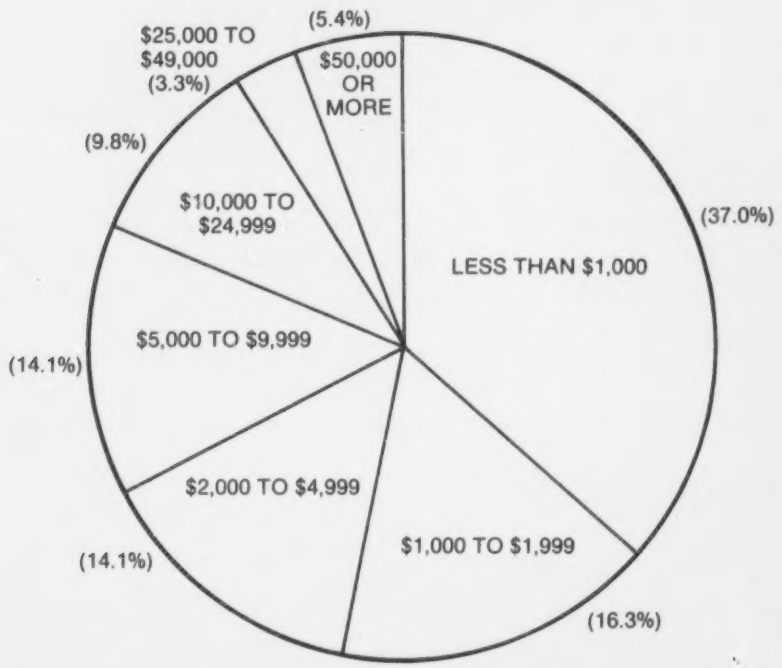


Manufacturers have been the most recent converts to basic skills testing. More than half of the manufacturing firms now requiring tests started these programs in the past five years. The early leaders — those with programs of at least ten years' standing — were educational institutions (54.6%) and government and military units (50%).

Table 4 of the Appendix offers the full statistical data for both years of program operation and 1988 costs.

The average cost of basic skills testing in 1988 was $10,000 (as reported by 92 respondents that gave figures). This average includes three companies that spent more than $100,000; with those companies factored out, the average drops to $5,300. Exhibit 9 shows the distribution among respondents.

COST OF TESTING PROGRAM IN 1988



Costs, naturally, are determined by the number of persons tested. Some large companies test only in selected job categories, while smaller ones test more widely. Thus the difference in average expenditures by organizational size is not large: small firms averaged $7,400, midsized firms $9,300, and large firms $17,900.

According to the two dozen human resources managers AMA interviewed by phone -- managers with direct responsibility for remedial courses -- *training* costs rarely exceed $300 per trainee. Moreover, as will be seen, companies often take advantage of labor and classroom space

donated by local educational institutions and governments. Since the single greatest expense in these training programs is for facilities, important savings are often realized.

[See box, "What Will It Cost?", in Chapter 2.]

These managers testify that the cost is well worth the result. Some cite lower assembly-line rejection rates, others point to measurable productivity increases. The best indication: a large majority of respondents now offering remedial training plan to increase their budgets and programs in the coming year.

With schools in crisis, corporations, acting in their own self-interest, are becoming the "educators of last resort." Most find that the payoff — in increased worker productivity and the ability to master new technology — is worth the price.

Those who have purchased *Basic Skills: Testing and Training* will receive the results of AMA's 1989–90 survey on workplace testing when the data is available.

2

Evaluating the Need

A survey questionnaire is not an examination; there are no "right" and "wrong" answers. AMA's survey instrument asked for quantitative data, skirting the issue of whether respondent firms *ought* to require proficiency testing in basic skills.

But that is a key question, and it leads immediately to others:

- *Why* should companies require such testing? And if not, why not?
- What available test instruments are both effective and fair? What makes them so?
- Should companies offer remedial training, on either a voluntary or compulsory basis?
- What type of remedial training is most effective? What makes it effective? What must companies do to implement such training?
- How can the effectiveness of remedial training best be measured?

In search of answers, we turned to three educators with national reputations in the field of adult remedial education. We invited them to respond in writing to these questions. This chapter summarizes their responses, quoting them at length.

The consensus view: proficiency testing can be useful, but most

testing instruments currently available are unsuitable, in that they are generic rather than job-specific. Training in basic skills is well advised, but ought not be called "remedial," and -- like the tests themselves -- must be closely related to actual job performance to be successful.

Our distinguished experts, in alphabetical order:

Karl O. Haigler currently serves as Special Advisor for Literacy to the governor of Mississippi. His service at the national level has included work with the National Endowment for the Humanities as a member of the Chairman's Study Group on the teaching of humanities in higher education.

From 1985 to 1988, Mr. Haigler served as the Director of the Adult Literacy Initiative at the U.S. Department of Education. The Initiative was responsible for building national awareness of the problem of adult functional illiteracy, working with other national groups in promoting effective solutions to the problem. He also served as the Director of the Division of Adult Education, the major federal program that funds adult literacy efforts, from 1986 to 1988. He has contributed to many national literacy projects, including Project Literacy U.S. (PLUS), the Gannett Foundation Literacy Challenge, the Kenan Foundation Family Literacy Project, and *The Bottom Line: Basic Skills in the Workplace*, a joint publication of the U.S. Departments of Education and Labor.

Dr. David Harman is president of the Institute for Corporate Education, headquartered in New York City. He is a professor of education at Teachers College of Columbia University. Born in Jerusalem, he received his B.A. at Hebrew University of Jerusalem and an Ed.D. at Harvard University.

He has authored *Adult Illiteracy in the United States* (with Carman St. John Hunter, 1979) and *Learning to be Parents: Principles, Programs, and Methods* (with Orville G. Brim, Jr., 1980). He was a contributor to the 1983 AMA Management Briefing *Workplace Literacy* (AMA Membership Publications, Anne Skagen, editor). More recently, Dr. Harman wrote *Turning Illiteracy Around: An Agenda for National Action* (1985), and *Illiteracy: A National Dilemma* (1987).

Diane Kangisser is Director, Literary Services, for MATRICES Consultants, Inc., based in Norwalk, Connecticut. She was executive director of Literacy Volunteers of New York City from 1973 to 1984, and as a consultant in the field of literacy she counts among her clients the Business Council for Effective Literacy and the Academy for Educational Development. For the Business Council, she authored *Pioneers in New Frontiers* (1984); *Job Related Basic Skills: A Guide for*

Employee Programs (1985); and *Developing an Employee Volunteer Literacy Program* (1986).

MATRICES offers consultation services designed for human resources managers and senior executives interested in determining the extent of their workplace literacy problems, and in designing effective solutions to address those problems. MATRICES also is a provider of training services designed to upgrade the knowledge and skills of human resources personnel relating to literacy assessment and the implementation of worksite literacy programs.

MATRICES' Literacy Assessment, Intervention, and Evaluation Projects measure employee competencies, assist in the design and implementation of on-site programs, and focus on on-the-job applications of skills learned, assisting human resources personnel in program design, modification, and application.

Should companies require proficiency tests?

Each of our analysts thought that the question should be rephrased to emphasize the correlation between organizational needs and individual skills. All warned that testing is not an end in itself; tests are tools that assist an organization in achieving some other objective.

Ms. Kangisser found these questions more useful: "What kinds of human resources decisions does the company need to make? Can proficiency tests help the company to make better decisions?" To answer, she continued, "You have to determine whether the attitude and skills required of new hires or current employees can be adequately and appropriately measured. Can you, for example, measure motivation to succeed -- a variable that often contributes more to a person's success than a specific test score . . . The issue is whether you can assess the particular types of reading skills needed for a job task, or whether you are just making 'a stab in the dark' by measuring some . . . publisher's idea of those needed skills."

Ms. Kangisser emphasized the interaction between testing and training. "Businesses today are experiencing a declining population pool, and soon will face a national shortage of entry-level employees," she wrote. "Using proficiency tests to 'weed out' candidates will only exacerbate an already difficult situation. Employers need to ask themselves whether they can educate current employees and new hires in the job-specific skills they require, including basic skills. An investment in *training* certainly will give companies more flexibility in meeting the future labor shortage than will an investment in *testing*."

For Ms. Kangisser, the key question is not "What do workers know?" but rather "What can workers *learn*?" "In this current environment," she wrote, "testing to measure learning potential would be a more useful tool for employers than proficiency testing."

As did his colleagues, Dr. Harman emphasized the match between organizational needs and worker abilities. "Schematically, companies should have accurate and detailed analyses of the skills, competencies, and knowledge necessary to perform different jobs and job clusters," he wrote. With these analyses in hand, the company would then have good reason to test:

- The extent to which the worker already possesses the skills, knowledge, and competencies necessary for job performance;
- The gaps, if any, that must be bridged if a worker is to assume and function successfully in the job;
- The degree to which the worker can take advantage of additional training--referred to, in some venues, as a "trainability index."

Specific conditions will determine how test results will be used, Dr. Harman advised. "If there is an adequate pool of applicants who are competent to assume the position without additional training, items two and three above become irrelevant. If, however, the applicant pool is not large enough and training is indicated, they become important.

"Following this logic," Dr. Harman continued, "testing current employees is necessary only under certain circumstances: when an individual is being considered for a job change that involves functions not presently practiced, or when the nature of a position changes, requiring different skills or competencies from those currently employed."

Dr. Harman termed proficiency tests "a significant tool" for employers, but cautioned that their efficiency depends upon which tests are used and how they are used.

Mr. Haigler noted that the federal courts have ruled that tests of general ability may be unsuitable unless they reflect actual job demands (*Griggs v. Duke Power Company*, among other cases). "Most importantly, proficiency testing needs to be anchored to the real-life literacy/basic skills demands of a job," he wrote. "Otherwise, testing takes on a 'data-keeping' function that may serve to screen out new hires or employees who otherwise may be able to perform on the job, but who do not have the more school-based skills that are measured by standardized tests."

According to Mr. Haigler, "Employees ought to see testing as the

company's way of assessing their potential as a basis for job placement. 'Literacy' ought to be understood broadly, encompassing higher-level skills such as information processing and 'learning how to learn.'" In this context, testing will be less threatening to those most in need -- and, perhaps, those most needed by the company.

What available test instruments are both effective and fair?

All our experts warned against most generic test instruments currently on the market. Because they fail to match employee competencies against specific job requirements, these consultants consider such tests neither effective nor fair. But there are exceptions that do indeed test the ability of the worker to perform the reading, math, and information-processing tasks of a particular job.

To Mr. Haigler, "the best examples of these instruments are found in the military." He notes specifically the Army's new Computer Assisted Instruction (CAI), Job Skills Education Program (JSEP). These tests assess an individual's readiness to be trained in a job against the actual demands of the job and the worker's basic skills mastery or prior knowledge. These instruments are being adapted for civilian use, and evaluated under a program sponsored by the National Alliance of Business.

Ineffective tests of "proficiency" are typically those that are "norm-referenced," testing generic basic skills or content knowledge that *may* be related to jobs, but more typically use measures such as grade-level reading ability. Such testing assumes that job demands (e.g., reading manuals) are best understood in terms of readability formulas and that employees reading below those levels cannot possibly function with more difficult materials on the job.

"These assumptions have been disproved by research in the military, findings that led to a congressional mandate that all 'basic skills' or 'remedial' instruction in the military be job-related and not generic in nature," Mr. Haigler pointed out. "This mandate affected on-duty time training primarily and has pointed the way to improved instructional practice in the military."

Ms. Kangisser found good words for the Aptitude Test Battery in the Apticom System produced by the Vocational Research Institute. She called this measure "both fair and effective, when appropriately used," and said it was "especially effective for entry-level jobs, as it assesses the nine primary aptitudes required in most jobs. Additionally, this measure was validated against the Department of Labor's General Aptitude Test Battery (GATB), considered by many to be

the most valid available selection device for predicting success in entry-level jobs.

"The Apticom System Aptitude Test Battery takes only 45 minutes to administer," Ms. Kangisser wrote, "and is designed in a game-like format rather than a 'paper-and-pencil' mode . . . It has subtests which focus on cognitive or thinking abilities as well as physical abilities (e.g., eye-hand coordination), so it provides a more integrated view of most employees or applicants."

But these recommendations were couched amid stiff warnings against the utility of tests that are not designed to match the requirements of specific jobs. Dr. Harman noted that "most of the available testing instruments have been designed as 'generic' tools; that is, they have been designed to provide information that has virtually universal application. This flies in the face of the 'principle of situation specificity' and the increasingly accepted notion of 'contextualization.' These concepts strongly assert that the skills and competencies required for job performance are usually determined by the concrete and particular characteristics of each and every workplace, and within it, by the diverse work centers."

Differing corporate cultures are of particular concern to Dr. Harman. "Surveys have clearly shown that local work cultures differ substantially," he warned. "Job specifications show wide variation; the same functions very often necessitate different sets of abilities when they are carried out at different sites.

"All of this argues for creating specific testing tools, devised so as to reflect the particulars of different contexts and situations. Generic tests often 'miss' aspects that may be important to a particular employer, while at the same time providing information that may be superfluous and misleading."

Ms. Kangisser also underlined, once again, the concern that all three experts felt about matching the test to the job. "The most effective [testing] measures are those that assess skills proficiency within the job context," she advised. "Only in that context can you accurately determine a person's skills or ability to apply those skills appropriately and with the desired performance results.

"As this concept implies," she continued, "the best tests are job simulations, including simulations constructed in print form. At the most basic level, this could involve the construction of a test using job-related reading materials. At its most complex, it would involve the design of assessment 'events' . . . For example, job-related reading skills, information processing, and communication skills --

all could be measured by providing an applicant with a standard operating procedure, by having the applicant read the procedure, and then by asking him or her to describe that procedure in his or her own words. The specific content and format for the assessment 'event' should replicate a real-life job situation as closely as possible."

In addition to simulations, Ms. Kangisser recommends aptitude tests. "While all aptitude measures cannot be considered fair or effective, some of these measures can be beneficial," she wrote. "One criterion to consider in selecting a valid and reliable aptitude test is whether the instrument is really an achievement or knowledge test, rather than a true aptitude or ability measure.

"The other key criterion is the testing mode itself, since a 'paper-and-pencil' test is immediately intimidating to some people, including those with adequate basic skills," Ms. Kangisser concluded.

Should companies offer remedial training on either a voluntary or compulsory basis?

Yes, they should -- but our experts agree that such training will not be successful unless it is relevant to the job. Another warning: such training ought not be called "remedial," as the term reverberates with negative connotations. "Continuing education," with course titles that use the word "improving" or "upgrading," offer the same instruction without the implications that surround the word "remedial."

It isn't necessary to differentiate between basic skills remediation and other ongoing training programs that keep the organization competitive. "Continuing education as a company policy for *all* employees, salaried and hourly alike, should be tied to the company's bottom-line posture in a competitive market," Mr. Haigler advised. "For instance, when survival is dependent upon improving quality control, it becomes necessary for workers, supervisors, and management to understand procedures like statistical process control. Fashioning a team-oriented approach, particularly when unions are involved, lets employees understand the importance of learning for the good of the company as a whole.

"In less drastic circumstances, employees should see their own advancement as hinging on 'continuing education,'" Mr. Haigler continued. "'Compulsion,' if used at all, should be articulated in career-oriented or retraining terms, not in terms of 'remediation' for employees with lower levels of formal education."

Whatever term is employed, the need for training is clear and present.

According to Ms. Kangisser, "the training challenge companies face is twofold: less literate entry-level workers, and higher literacy levels needed for changing jobs. Most companies don't really have a choice about the first challenge, given projected workforce demographics. With the coming population decline, companies will no longer have the luxury of screening out large numbers of potential employees with lower skills, since the total pool of employees will be smaller, and the poorly educated will become an increasing percentage of that pool.

"But the second challenge is even more critical," wrote Ms. Kangisser. "The changes now occurring in the nature of work will ultimately mandate literacy training for *all* employees, not just the undereducated. International competition is forcing companies, large and small, to innovate at a much faster pace. These changes have increased the range and complexity of job tasks and responsibilities. Each time we introduce a new tool, process, or method of work, we require different and enhanced thinking and literacy skills from employees. Workers need job upgrading to handle new technology; their literacy skills also need upgrading so they can handle the related new literacy requirements of the job."

What should training include? "Companies are clamoring for workers with problem-solving, interpersonal, and communication skills," Ms. Kangisser pointed out. "In order for workers to participate in the decision making and skilled operations now demanded in the changing workplace, they need more than basic literacy skills. For successful job performance, they must utilize information-processing skills.

"Information-processing ability consists of skills and knowledge that allows a worker to understand and use both printed materials and oral language on the job," Ms. Kangisser continued. "Unfortunately, studies of the information-processing abilities of young adults in this country reveal marked deficiencies."

Dr. Harman's endorsement of ongoing training is somewhat more qualified. "Training in the present context — that is, training that is geared towards bridging skills and knowledge gaps found through the testing process — can be valuable under certain conditions," he wrote. "Training has value if its substance applies to real-life work situations. If trainees clearly see the connection between what they are being taught and keeping a particular job, then chances are that training will be effective. By the same token, if these conditions do not apply, the effectiveness of the training is greatly diminished."

Dr. Harman reiterated the central principle of all adult education: the theory of relevance. "The more directly relevant the substance is

to the concerns and motivations of participants, the more likely it is that real learning will occur. Trainees will be more likely to benefit from training if they are aware themselves of the gaps in their skills and of the goals of the training."

Dr. Harman identified a special problem in basic skills training for lower-level employees. Workers at such levels "are less likely to relate to what is, for them, something of an abstraction," he wrote. "If the basic skills training they are offered is directly related to what they either know or believe to be necessary to do a job, they will generally respond. Training should not be offered when participants cannot appreciate its significance."

For much the same reason, Dr. Harman advised, "participation in training should be voluntary. Coerced participation usually mitigates against effective learning. This does not mean, however, that training as a requirement for jobs should be waived. Those who choose not to attend offered training programs in effect remove themselves from candidacy for jobs and opportunities for advancement. Training requires a commitment from the participants, and therefore the choice as to whether to attend should be left up to them."

What types of remedial training are most effective?

Our experts no more believed in generic training than in generic testing. As in any corporate initiative, the process must have specific goals that aim in the same direction as the company's strategic thrust — the goal being, in this case, a more productive workforce.

Dr. Harman took it back to basics. "Effective training *initiates* and then *sustains* a learning process," he wrote. "Indeed, all teaching aims at eliciting and stimulating learning. There cannot be effective instruction of any sort if there is no parallel learning. Thus effective training is designed with the learning characteristics of its participants in mind.

"I do not believe in 'generic' training — that is, in packaged programs that purport to instruct material to anonymous audiences in abstract environments," Dr. Harman continued. "The most effective training — remedial or otherwise — is designed for very specific, known audiences, and relates to equally specific contexts and environments."

To implement such training, "Companies ought to custom-design their programs," Dr. Harman urged. "Certainly, abstractions should be avoided. Instruction should carefully reflect the real requirements

of the workers' environment. For this reason, I cannot recommend any particular training package. The ones that exist are simply not appropriate in their entirety, even though some components may be relevant.

"There are no specific organizations or institutions one can recommend," Dr. Harman continued in the same vein. "A number of university experts are very proficient in carrying out the kind of background investigative work necessary for curriculum development, and a small number of private consulting firms have specialized in designing and developing customized training programs. These would be the most appropriate resources for assistance."

Ms. Kangisser provided the specifics that Dr. Harman called for. "In the MATRICES Workplace Literacy Model, information processing encompasses *literacy skills* (reading, writing, listening/speaking, and computation), *thinking skills* (the ability to organize and communicate information), and the *prior knowledge* or background information necessary to identify and interpret information in written and oral forms," she wrote.

"To ensure a good match between training and the job, instructional methods, training materials, and teaching styles must be brought together. In a job-specific literacy program, the most effective instructors are the company's own trainers, or a team comprised of those trainers and literacy specialists. In that way, literacy programs become embedded in the organization, and human and financial resources are conserved.

"Furthermore, the knowledge and skills development conducted in the training program must be consistent with the information-processing activities required on the job. If they match, the training will be effective. If there are discrepancies -- which is often the case in established training programs -- then the training design must be altered.

"In order for training to succeed, it has to motivate the trainees and help them transfer what they learn to the real-life situation. The immediate practical value of the training [must be] evident, and hence there is a strong incentive for job retention and job mobility.

"Moreover, effective training uses situations, tasks, and materials that the learner will encounter on the job as part of the instruction program, and makes the relationship clear to the trainee during the instruction in order to ensure later transfer of skills."

What must companies do to implement functional context training?

"First," Ms. Kangisser answers, "the learning context has to be established; that is, the *job* has to be defined. The context includes *needs* (the job's literacy requirements); *goals* (where employees should be in terms of competencies); and *application* (how well employees apply their skills to the job).

However, technical trainers often assume that learners already have study skills to handle any text material and absorb complex concepts, Ms. Kangisser warns. "They are often not aware of the learning needs of trainees with literacy deficiencies, or of techniques to teach literacy through a content area. An external educational consultant can provide training for company trainers across the whole range of components for effective literacy instruction. This 'train-the-trainer' activity ideally would occur before a training program is planned. Ongoing consultation assistance may be provided during the development and implementation stages of a company's first workplace literacy project."

Should such training be compulsory or voluntary? "Compulsory," Ms. Kangisser answers. "Since the purpose of a job-specific literacy program is to improve job performance, compulsory attendance is warranted. Ideally, *all* employees in a job category would receive training, so those with lower skills are not singled out or stigmatized.

"In any case, recruitment efforts must be nonthreatening and sensitive to the fears of employees. If the program is voluntary, there is a risk that employees with lower skills will not come forward."

On company time, or not? "Release time for training would be the most appropriate course, for several reasons," wrote Ms. Kangisser. "First, it demonstrates the company's commitment to skills development. Second, training on company time will not conflict with the employees' outside life. And finally, workplace literacy programs that can upgrade jobs for employees will have the greatest impact on return on investment."

Specificity of program content was also important to Mr. Haigler. "Partnership efforts need to be informed by answers to questions that address the company's bottom line," he advised. Among the questions:

- What specifically will the training provider do to assess the current skills and training needs of the employees?
- What human resources will be required from the company?
- Does the training provider believe that the employees will be able to demonstrate the benefits of the program — by performing

more effectively on the job, reducing absenteeism, achieving promotion, *et al*?

- What will be done to evaluate the effectiveness of the program?

In assessing both testing and training, the three experts again and again stressed the importance of the individual. Statistics, including AMA's own survey findings, by their nature address the standing and needs of *groups*. But in addressing the problems that the statistics identify, the greatest need is *individuation* -- tests that measure an individual's aptitude for a particular job, and training that enables an individual to perform that job for his or her own benefit, as well as the benefit of the organization.

How can the effectiveness of skills training best be measured?

For Mr. Haigler, it's best to avoid the temptation to measure program effectiveness in simple terms -- for example, with stated goals such as "the employee will gain 1.5 grade levels in reading and math for every 100 hours of instruction," or "the employee will obtain the equivalent of a high school diploma."

"Accepting ready-made indicators of effectiveness means that companies are accepting what the adult education provider can deliver," he wrote. "The larger question is whether or not such traditional, school-based measures easily transfer to the actual skills needed by employees in real job performance. For instance, the skills needed in basic mathematics — fractions, decimals, division, and the like -- may be involved in an employee's job, but the curriculum that is offered may teach these skills in such a way so that they can be measured by a norm-referenced, school-based test.

"Workplace research at Columbia University has shown, however, that employees may be able to use fractions in sorting delivery orders but be unable to pass a test that measures basic skills proficiency. Not only may school-based measurements bias curriculum decisions, they may also reinforce hiring and promotion decisions in ways that have little to do with an employee's ability to perform on the job.

"What business should be aiming for instead are measures that are more *competency*-oriented, more job-related -- measures that can serve for improving instruction as well as management decisions. 'Measurements of effectiveness' should consist of functional statements that tie as closely as possible performance in the training program to performance on the job.

"Finally, an employee-centered approach to 'measurement' and training

philosophy ought to lead to a broadening of an employee's mental horizon, to the realization that as an adult learner he can begin to transfer what he is learning to new contexts," Mr. Haigler concluded. "Successful programs in workplace literacy should aspire to the development of human resources. The improvement of 'skills' in a narrow context is ultimately not enough; success in workplace training programs can lead adult learners to more active participation in the lives of their families and communities."

Ms. Kangisser agrees with the need to measure effectiveness within the context of job performance. "As with any testing or measurement, an effective way of assessing training is to analyze the application of new learning in context," she wrote. "It is critical to examine the use of newly learned basic skills on the job. For this purpose, the preferred approach to assessment is a job simulation or real-life job situation, where employees are required to perform operations accurately and effectively.

"The measurement should be objective, however, rather than an open-ended observation or interview," Ms. Kangisser advised. "This approach requires the quantification of certain job functions or processes — a technique that involves careful task analysis and assessment development."

Addressing the issue of measuring program effectiveness, Dr. Harman employs a familiar adage: "The proof of the pudding is in the eating." The key: How do program "graduates" perform their jobs after training?

"Measurement can take several approaches, some in tandem with others," he wrote. "Observation is clearly one: the newly trained employee should be observed on the job in order to ascertain whether the training lessons have been learned. Another approach is to question immediate supervisors, asking them to assess a trainee's performance. A third would look at the results of job functions themselves: are they being performed well or badly? This last approach works best when jobs have concrete outputs that lend themselves to quantitative evaluation."

Why not simply test program graduates? Because, Dr. Harman said, that leads back to the original problem with skills testing: the results often show little more than the ability to test well. "So many unrelated factors can intervene to render the results of such testing inaccurate, even misleading," he counseled. So-called "happiness scales" that test student satisfaction with the program are equally inaccurate. "Often, satisfaction is a result of totally irrelevant factors: the personality of the instructor, the training environment, the amenities offered.

"In effect, measurement should be as customized as the training itself," Dr. Harman insisted. "The means for measurement have to be situation-specific, and tailored to the needs of the worksite and the employees -- far less to an unrelated, and not necessarily useful, measurement scale."

WHAT WILL IT COST?

There is no definitive answer to the cost of a workplace literacy program, says Diane Kangisser. Among the variables in budgeting: educational providers and/or consultants, curriculum and materials, and available internal resources.

In general, the start-up costs of a program include:

1. Assessment;
2. Curriculum development;
3. Design of learning site;
4. Purchase of equipment and materials;
5. Recruitment and assessment of employees; and
6. Training for trainers.

The ongoing costs include the salary of a staff coordinator, instructors' wages, employee wages for release time, and materials replacement.

Ms. Kangisser cautions that companies avoid a penny-wise, pound-foolish mentality. The least expensive way to run a program may, in the long run, not be the most efficacious. "Remember," she states, "investing in the workforce is crucial to future business development, productivity and, ultimately, company profitability."

3

Addressing the Need

A manufacturing firm in the AMA sample recently inaugurated a new process that required a finer degree of calibration: measurements previously taken in eighths of an inch now had to be converted to sixty-fourths of an inch. But when the new process was introduced to shop floor workers, their supervisor received a shock.

"Not only couldn't they convert eighths to sixty-fourths," he told an AMA researcher, "we found that some of them couldn't even read a ruler!"

We interviewed this supervisor, and more than two dozen other representatives of respondent firms, to gain information on remedial training programs. Then, we spoke at length with human resources managers and others responsible for remedial training at three pioneer firms: the Onan Corporation, a midwestern manufacturer of electrical machinery; General Motors (specifically, its facility in Rochester, New York); and the Motorola Corporation, which has its Corporate Center for Training and Development in the Chicago suburb of Schaumberg, Illinois.

THE AMA SAMPLE: SHOCKED INTO ACTION

We found that the "shock of discovery" that employees lacked basic reading and math skills was often the trigger that propelled an AMA respondent firm into remedial education. One manager, discussing the results of a questionnaire distributed to shop floor workers, recalled the surprising results. "They were asked, 'Twenty is what percent of one hundred?' — and they didn't know," he said. "I thought, 'What the hell is going on here?' They were bombing out on the simplest questions."

A state power division official put the problem in perspective when she commented, "Literacy levels aren't just nice to have. They're important to public safety. If you assume someone can't read a newspaper at a fifth-grade level, then you have to assume they can't read a safety order. That can be dangerous — even deadly."

Contrary to what many managers assumed, the core of their trainees were not new employees or those needing tutoring in English as a second language. In the 30 training programs that AMA profiled, participants were, on the whole, very much a cross-section of the company workforce, with at least one year, and usually three years, on the job. Their ages ranged from 19 to 50, although the bulk of participants (like the bulk of the overall workforce) were between 25 and 45 years old.

Participation in these remedial programs is generally voluntary. "Learn or else" has never been the greatest incentive for expanding knowledge, and no small amount of thought went into the recruitment process. "Folks don't want to be singled out," one manager testified. "We try to make it as informal as possible." Even respondents who indicated that they had "strongly suggested" remedial training emphasized that they didn't want to force people to participate. "We didn't want them to feel singled out," one manager stressed.

Many companies said that they relied on supervisors' recommendations to identify employees with deficiencies in basic skills. One reported that it was only due to supervisor recommendations that a remedial training program was contemplated. After all, the spokesperson commented, supervisors directly observed employee performance and customer contacts, and would recognize a lack of basic skills most immediately. While an employee's job security reportedly was never in question, promotions and a future with the company were certainly a concern for both employer and employee.

Occasionally, recruiters encountered resistance. "But," one reported, "after their friends and colleagues had gone through the program, they started dropping by my office to find out how they could be involved."

In a low-key approach, several firms trusted to the company grapevine, a bulletin board, or a newsletter to inform employees and to invite enrollment. "We just put it in the newsletter," reports a spokesperson for the Los Angeles Department of Water and Power. "It was amazing how motivated people were. We had a big turnout and even had to limit it to a first come, first served basis."

In this Los Angeles program, volunteers were tested to determine individual needs. Other companies used testing as an initial screening device. Some employed standardized tests from national vendors; others devised their own tests, creating work-related problems.

The areas in which remedial training was needed at the profiled companies were fairly evenly divided among reading, writing, and math. Companies where mathematics was integral to job expertise tended to identify math deficiencies, whereas service-oriented companies, in which staffers routinely deal with the public, tended to identify reading and writing deficiencies. However, it seems that once the box was opened there was no shutting the lid. Almost all companies that started with remedial training in one area have since decided to expand their programs to include all basic skills, leading to an educationally well-rounded workforce.

MONEY MATTERS

Ultimately, the issue of remedial training (and for that matter *any* training) translates into dollars and cents. Every company surveyed said that its costs were reasonable, and its results well worth the expenditure. Those costs ranged from $36,000 a year for educating almost three dozen employees to no cost at all. Most programs incurred some expense, but the average was no more than a few hundred dollars a person.

Low costs didn't necessarily mean bargain-basement instruction. Indeed, the main difference in costs had to do with the choice of training sites, rather than the nature of the material covered. For the most part, higher costs were incurred when companies opted for on-site training, utilizing in-house classrooms or conference rooms, hiring instructors, and providing the training on company time.

Program Profiles

Various alternatives in program delivery proved equally effective. Some companies use current staffers to provide instruction. A Rhode

Island-based firm provides a one-hour, videotaped orientation that outlines the company's history and philosophy. Supervisors then help trainees hone their math skills as they work on dummy computer terminals. Conference rooms are utilized as classrooms for lectures. Sample "shop floor" problems are set up in the safety of the classroom. Once the problems are mastered, supervisors work with trainees on the shop floor, translating theory into practice.

One service provider concentrates on verbal skills, assigning writing exercises and speaking assignments. After the exercise is completed, the instructor gives individual feedback. The one-on-one approach has been highly effective for this firm.

In some cases, outside professionals are brought on site to teach remedial courses. Often the teachers are from a local high school or community college. They may bring their own educational material with them, or programs and textbooks are purchased on the advice of special educational consultants. For more complicated requirements (one example: reading blueprints), company personnel work with outside practicing professionals.

Many companies found benefits in forming a partnership with an outside professional. "It was impossible for the teacher to really know all of what we needed," reported a manager in a technical paper goods firm. "I had to xerox a copy of a ruler to upgrade basic measurement and math skills. The teacher was surprised that the employees lacked these skills, but I had worked with them. I knew this was part of what we needed."

At times, on-site training was impractical or undesirable. High school classrooms and teachers were found to be an excellent alternative. Elsewhere, community colleges provided space, materials, and teachers. These alternatives offer not only ready-to-use facilities, but also the ambiance of higher education. And through partnerships with state and local education departments, costs were dramatically reduced.

One Tennessee employer joined with other companies in several counties to organize a program where trainees from various industries attended classes together. Another purchased an interactive video system, complete with video lessons, study guides, and workbooks; a nearby technological college provided the workspace. Employees interact with their lessons at their own speed, aided by on-site instructors.

The courses offered provide different benefits for the participants. In some cases, helping participants to "get up to speed" with their

coworkers was the goal. In others, employees may earn Immigration and Naturalization Service credits, General Equivalency Diplomas, or even college credits.

ON WHOSE TIME?

Companies interviewed were evenly divided on the issue of using company time for remedial training. A few split the difference: classes were held after hours, while practical application of the training took place during the workday.

Closed- Or Open-Ended?

The length of remedial training programs varies. On average, they hold sessions once a week for at least three months, sometimes longer. The lengthiest program had employees attending three-hour sessions twice a week for five months. The supervisor in charge felt the results justified the man-hours expended. "I don't think anyone does well in a one-shot, eight-hour thing or in short-term attempts," she said. "You need to develop trust as well as skills. It's a delicate balance."

Another "delicate" matter must be confronted when the courses conclude. Old prejudices are still at work; many employees take no particular pride in a demonstration of their need for remedial training. In light of this, over half the companies with which we spoke downplay the end of term and merely discuss personal evaluations or test scores with participants. However, there are managers whose companies "make a fuss," in one personnel director's description, over program "graduates": there is a presentation of "diplomas," certificates signed by the firm's general manager. Yet even here, the ceremony is rather low-key.

"We don't produce a lot of fanfare. People are sensitive about this, some might be embarrassed," commented another manager. "But we want to show them that management is positive about their efforts, and that's why we hand out diplomas." The thought was echoed by another manager whose firm liked the idea of a small ceremony. "It's a corporate image that we're talking about," he said. "We want to promote from within and help our people advance within the firm. We support the concept of family . . . we're in there helping each other. I think people want to stay with us when they know we're interested in helping them help themselves."

Companies that sponsor remedial programs are almost unanimously enthusiastic about the results, with evaluations ranging from "very

successful" to "superb" and "outstanding." Nevertheless, many program managers felt that there is room for improvement. One personnel director thought that the degree of self-instruction in his program hampered progress. "In retrospect, I now see that the group should be allowed to learn more from one another," he reflected. "In the future, we're going to set it up so that our people can listen to each other. I really think it helps to hear how others go about problem solving."

No supervisor felt that remedial programs went to waste. Along with the practical results, some have reaped an unexpected harvest.

"I happen to know people who used to have friends fill out forms for them," reports one personnel director. "After our course, one student gave me a form for a promotion and said, 'This won't be very neat, but I did it myself. Will you read it?' A year ago he would have had someone else fill it out. Now I know he's capable of doing that himself."

TRAINING PROGRAMS: THE FOOTSTEPS OF OTHERS

Here, now, are three unique stories -- how a midwestern manufacturer, an auto maker in the northeast, and a southwestern semiconductor facility are providing for their futures and those of their workers with remedial training programs that work -- and work because they are closely tied to additional, job-specific training that applies directly to their activity on the shop floor.

At Onan Corporation in Minnesota, workers and managers talk about how and why training has evolved over the last six years. At a General Motors facility in Rochester, New York, management and United Auto Workers Local 1097 cooperate to help workers gain high school diplomas and new skills -- with money provided by the state. And at Motorola Corporation, Arizona trainers are given wide leeway to steer their own training courses toward improved quality and lower costs. These stories demonstrate that with the proper commitment from top management, cooperation between participants, and full exploitation of local resources, education and training can be a morale-building challenge.

Onan: The Evolution of Success

"People with an eye to the future take classes to stay sharp and to keep up with the demands of changing jobs and new equipment."

So reads the first page of the Onan Corporation's Winter 1989 course catalog. The blue stapled pages explain the courses offered; there are

more than 20 this term. Nearly 1,300 employees have participated in training courses since the company kicked off the program in 1983.

At that time, Onan had been in business for over 50 years. David Onan started making portable electrical generator sets in the late 1920s. In the '30s, his company expanded as he developed air-cooled engines and AC generators. Then, during World War II, the company produced over half of the portable electric generators used by the Allied forces. After a series of mergers, Onan was bought by Cummins Engine Corporation in 1986.

Like other American manufacturers, Onan has faced damaging foreign competition since the 1970s. The company has responded by committing itself to move toward a fully flexible manufacturing system. The first step was to invest heavily in automation -- several million dollars a year went for the new machinery. At the same time, Onan wanted to implement statistical quality control and to pilot a participative management program, modeled after General Motors.

To support these shifts, technical courses were offered to workers. But as so many companies have discovered in the 1980s, it wasn't enough to provide technical training. One course, requested by a line manager in 1982, was designed to teach geometric dimensioning. Over 120 employees registered, but many lacked the reading and math skills required to master the material. Some employees were unable to complete the initial survey instruments. According to training manager Sue Peterson, "We needed to step back and say to the director, 'We need to offer some basic reading and math courses first.'"

To that point, Onan's story is anything but unique. It has occurred time and again across the country. A company's managers want to move forward with new technology or participative management. They start to put a training program in place, only to find that they have misjudged the level of training needed. They discover that it will take a special effort to bring the workforce up to speed.

At Onan, the result of this realization was the Manufacturing Education Program (MEP), designed in 1983. According to Linda Lindsey, the current Manager of Training and Development, MEP has evolved as the requirements of workers and management have become more clearly defined, and continues to evolve to meet changing needs. The program was originally planned by a four-member team from the Division of Industrial Education at the University of Minnesota. In six weeks, the group assessed the company's training needs and devised a plan. They started with a set of management assumptions:

- Programming would be after hours;
- Courses would be paid for through the educational assistance program; and
- Most course instructors and materials would come from outside.

They collected data through group and individual interviews and via two written instruments: a checklist to assess worker perceptions, and a more open-ended questionnaire for supervisors. The assessment also included a review of company documents and a search of the surrounding community for resources. (*For guidelines on how to do a needs assessment, please see Chapter 4, "Organizing the Response."*)

After six weeks of work, the team decided to recommend two levels of training. Level I courses, available to hourly workers as well as to supervisors, would have no prerequisites and no link to job reassignment. Courses would include basic electricity, blueprint reading, genset electrical systems, and basic hydraulics. Level II courses would be more tightly linked to specific jobs and could lead to job changes. Subjects would include statistical quality control and geometric dimensioning.

As reported in the AMA Management Briefing *Workplace Literacy* (AMA Membership Publications, 1983), another level of more general education was soon added to help prepare employees for the technical and job-specific training. Sue Peterson told us at the time that despite the rigorous initial assessment, "When we started to offer technical courses, we found that some of the students didn't have the basic reading and math skills. For these individuals, we had to move to a still more basic curriculum."

The present system has changed in the ensuing years. Courses in general education (reading, writing, mathematics) and in technical skills are offered as the MEP program. In addition, there is a developing "MEP-2." Emphasizing job relevance, it takes place in the student's department area; the training is provided during the workday, and is considered a direct part of the worker's job. Thus, Lindsey says, it is "not so voluntary" as the MEP courses are. Training under MEP-2 is often assigned to whole departments, and is responsive to the constantly changing technological environment.

To develop this new program, Lindsey's group asked supervisors what skills their department lacked now and what skills they would lack in the future. They asked the supervisors to identify workers who already had the needed skills. The worker-instructors were trained in teaching methods, unless they had prior experience as educators. Then, with the supervisors and the training department, they developed course structure and content. The instructors led the

discussion of content, and the training department contributed valuable expertise on course structure and how to develop learning materials.

As new courses are developed, the process is repeated. Assessment of both MEP and MEP-2 is ongoing, and changes are made in response to student, instructor, and supervisor suggestions. For example, a recent survey of manufacturing supervisors, superintendents, and manufacturing support personnel determined that 80 percent of the respondents thought that blueprint reading was essential for their area. In response, Onan looked for ways to further promote the blueprint reading course, to tie it tightly to Onan blueprints, and to respond to still more specific departmental needs through MEP-2 courses.

Another concern identified by the supervisor survey was the need to increase MEP participation. The company has tried to enhance the courseware, adding "Introduction to Electricity" and "Onan Product Knowledge," among others. The supervisors also suggested more recognition for participants and more direct ties to promotion or pay raises.

To facilitate communication between employees and training administrators, Onan has created the Manufacturing Education Program Advisory Council. According to Pat Glessing, a worker who sat on the first council, the purpose is "to go out and talk to the employees to find out what would work for them, what would give them the incentive to take the courses." The group, which meets at least four times annually, also acts as a sounding board to test new course ideas and policies. Council members include three high-level executives, including the director of manufacturing for the electrical products division; at least one representative from Lindsey's department; at least one MEP instructor; and hourly employees from operations. The employees are selected by the production manager to serve twelve-month terms.

Bernell Fedge has worked with the Onan trainers since MEP's inception, and with the trainers at many local manufacturers. He is coordinator of Metro-North Adult Basic Education, a consortium of eight school districts. Nearly all of the MEP courses are developed in cooperation with outside organizations; the courses are taught at the Onan facility by outside instructors, using materials that the instructors bring with them and adapt to fit the needs and experience of the Onan students.

Fedge thinks that this is the optimal arrangement. "There are a number of ways we can serve companies," he says. "If we deal with a larger company, and one that understands the critical importance of adult

education, literacy, and basic skills training -- and that's a big 'if' -- we may be able to set up on-site classes." In other cases, outside training like Fedge's adult education classes can be a viable solution. But Fedge far prefers on-site training. He says that classes decrease in effectiveness as they get farther from the workplace, in geography as well as in content. The less abstract, the less like "school," the better.

In response to advice like this, Onan has tried to tie its courses as directly as possible to the students' jobs. Fedge thinks that Onan has succeeded in this very difficult area. "Even after eight or nine years, we've barely scratched the surface," he emphasizes. "This kind of teaching isn't what we experienced in college; we've never experienced it in our lives, and it's very hard to do." But it's critical. When asked what special factors contribute to program success, he said, "I have nothing new to add to that. Every piece of research I've ever read says the same thing. You've got to make the learning every bit as experiential and tightly connected and applicable as you can."

Forty-eight different courses have been offered through MEP since 1983. The most popular of these have been courses like Math Refresher, Algebra I, and Electricity I. The algebra course, for instance, has been attended by over 160 employees. Blueprint Reading, attended by 54 students, has also been popular.

Employees often choose the courses they will take based on recommendations by their supervisors. In addition, the course catalog provides course descriptions, prerequisites, and performance objectives. One course description reads:

> Has your "math memory" faded? Math Refresher is a great place to get you back on the "math track." Here, you can tune up your basic skills in addition, subtraction, multiplication, and division. It's also a good way to revisit decimals, fractions, and percents. Best of all, you can work at your own pace on the math skills you need on the job.

The catalog entry also lists 19 extremely specific "Performance Objectives." For instance:

> Given a variety of fractions, the student will reduce fractions to the lowest terms with a minimum accuracy of 80 percent.

Although basic courses like these have had the highest overall enrollment, increasing numbers of employees are now taking higher-level courses, such as Trigonometry, Statistical Quality Assurance I and II, and Solid State Electronics. According to Linda Lindsey, this is happening because so many employees have already acquired the more

basic skills. She says that at one time Onan trainers had foreseen phasing out classes in reading, writing, and basic math, but that they now believe that there will always be a need for such courses. Even if all current employees were to lift their skills above the need for such classes, there would still be new hires, fresh from high school but often with inadequate skills.

GM-UAW: Cooperation is Critical

In 1986, Bud Holler was on the executive board of United Auto Workers (UAW) Local 1097 in Rochester, New York. When General Motors asked for a union member to cooperate with the Rochester plant on education and training, the other board members agreed that Holler should do it. "I was the only one with a B.A. degree so they figured I must know a lot about education," he recalls.

Holler laughs as he tells the story. At that time, he says, "GM was being clobbered by the competition. We were industry leaders and innovators, but our pricing was way out of line in some cases and we had some real problems on quality. Something could be coming off the line, let's say 2,000 parts, and there could be a 15 percent rejection rate. That's extremely costly and it hurts the company and the workers."

The education and training program that the union and the company instituted was highly successful. Holler says, "After the education programs, and because of the new emphasis on quality control, the rejection rate may be down to one-half of one percent. That's the kind of impressive result we've achieved."

In 1986, GM Rochester switched from carburetors to more complicated fuel injection systems. According to Chuck Tisa, supervisor of Employee Development and Employee Involvement, that's what spurred the decision to implement new training programs. Higher technical skills would be needed to handle the more complex machinery, creating a need for "competency-based training." And there would be a significant difference in the manufacturing process as well as in the technology. According to Holler, there were two consequences: downsizing by about 40 percent, and an upgrading of the remaining workforce through training. But, as with Onan, GM and UAW Local 1097 couldn't begin technical training until some basic education needs were met.

In addition, GM was pushing to tighten cost efficiency by reworking the employee classification system. Classification of workers had mushroomed, so that the system was unwieldy and jobs were over-specialized. Just as bad, promotions and all decisions affecting employees depended almost solely on seniority.

No more. GM and the UAW worked out a contract in 1986 that boiled the classification system for hourly workers down to just three classes. The "A" class requires the highest skill levels; job setters are on that level. "B" level workers include stock handlers and repairmen, and "C" level is for operators. Workers in each classification are required to do a variety of jobs; gone are the days when line workers spent Chaplinesque eight-hour shifts turning a screw a half turn. The three-level system increased flexibility in an over-specialized industry, as well as job responsibility. But like the technology switch, the classification restructuring added a training burden to the Rochester organization.

Other changes tied promotions directly to job competence. Before the change, a low-classification worker in machining could be promoted several levels, finally rising to supervisor in the assembly area. Now, to get to the A level in a department, a worker has to work his or her way up through all three levels in that department. Competency is evaluated at each step.

To Holler, the first priority was the welfare of the employees. "We wanted to take into account the needs, first, of the union membership, and, second, the needs of the corporation, the management." Holler and Dr. Louise Paxton, his GM counterpart, began with a worker survey via mailed questionnaires, which employees dropped off at work. The questionnaires were anonymous, and asked what courses the employees would prefer. The employees responded by asking for General Equivalency Diploma (GED) and English as a Second Language (ESL) courses, math refreshers, computer courses, blueprint reading, and a variety of others. In all, 25 percent wanted some training in a general education area.

According to Holler, "These kinds of programs are often looked at as a threat by the line people in the workforce, because there's an occasional tendency for managers to do an educational assessment of needs, and then use the result as an excuse to fire people. We wanted to make sure that this wouldn't be perceived as a threat."

Today, the Rochester basic education training programs seem to emphasize what workers want, as well as what management wants. Most students gear their study toward earning a GED. They attend classes in a converted elementary school, studying full time and at full pay. Students are first assessed for placement by teachers, using conventional tests. Most of them study for a minimum of four weeks, after which they undergo normal academic testing. Based on results, further educational plans are made. Some students have gone to school for as long as eight months. The general education program operates with the cooperation of the school system, Monroe County, and New York State.

Only salaries are paid by GM; all strictly educational expenses are paid by the state.

There is a disadvantage to full-time study. Tisa feels that some workers are gone from the plant for so long that they lose touch with fellow workers and become alienated from the GM culture. He still supports the full-time approach to study, however, feeling that a work-study approach would put too much strain on employees' time and energy.

And, he says, the results are all he could hope for. "We see a tremendous payoff when they come back to the plant. The workers are more at ease with the [technical] competency program, and they also have a really positive feeling. For many of them, it's something that they've wanted for a long time." Of the 3,800 workers at the plant, over 600 employees have gone through the program, and three-quarters of these have received diplomas.

After their return, workers are better prepared for technical training. A typical course may cover a specific machine, "everything from the on-off switch to how to troubleshoot some breakdowns," according to Tisa. Each is based on a "competency," an ability to perform an entire complex function. Most of the trainers are workers who are already expert in the operation of a process or piece of complex machinery. The classes, which generally have only three or four people, can last up to six weeks for training in a difficult process like die casting. As in the general education program, training is full time. It is held on the shop floor and budgeted by each department individually. The in-depth competency training helps workers to adjust to new technology and to the new job classification system, in which the old functions like products inspector and set-up man have been fused. New competency-based training modules are continually being written by trainers and training staff and new trainers approached.

According to Tisa, management is thrilled with rising quality, a corporate priority, and with lower costs. According to union vice president Holler, the workers are extremely happy with the programs as well. He says that the best measures of worker satisfaction are union election results, and in the last election, held since the new contract was negotiated and the training programs begun, about 95 percent of the union incumbents retained their offices.

Both men attribute the success of the GM-UAW programs in part to accurate assessment of need. As Holler said, "There's no use setting up a GED program if your entire workforce already has diplomas. Now that seems like an obvious point, but there are companies out there that

see a statistic somewhere that says that 20 percent of the workforce doesn't have the GED, and just assumes that their workforce must be the same." GM's ongoing assessment process was designed with the help of Dr. Peter Esseff, a Maryland-based consultant who specializes in teaching trainers to set up structured approaches to needs assessment and program development.

But according to Tisa, the really critical factor was close cooperation between the management, the workers, and the schools. Holler agrees: "Communication is a critical factor. Employees can feel threatened by any new programs, and indeed some companies do use education assessment in the wrong way, to justify layoffs. Instead, the whole thing should be presented as an opportunity for future growth. This is especially important, I think, in union environments."

Motorola: Avoiding Future Problems

"It's not a matter of the workers 'dumbing down,' but of the technology changing." According to Tom Fordonski of the Motorola Training and Education Center in Schaumburg, Illinois, just north of Chicago, that's why training became a corporate priority at Motorola in the early 1980s.

Fordonski elaborates: "Workers are intelligent; they always have been. They have always been doing problem solving, for instance, but now the problem solving requires them to use different tools."

Training and education have had a strong push from CEO Bob Galvin, and the trainers at Motorola say that having a highly placed champion really made the programs work. The training was a necessary strategy to achieve larger Motorola goals: a shift to participative management, globalization, and, in the words of Al Ramias, in charge of training for the East Valley semiconductor facilities in Arizona, a "top-to-bottom effort to change product quality."

Motorola has decentralized operations in order to push responsibility down the pyramid, and that extends to training programs. Each location develops its own programs, with only minimal direction from corporate headquarters. Many Motorola branches cooperate with local school districts or community colleges in setting up training for employees. Motorola also uses these relationships to try to help the schools prepare students better before graduation. Some branches use private consulting firms as well.

Corporate training executives think that the decentralized system is efficient in reaching Motorola's 60,000 U.S. employees, 12,500 of whom

need remediation in math, reading, or using English as a second language. This system is also an excellent laboratory for testing various training approaches. The corporate training experts are now beginning a study of all Motorola training and education programs to see which approaches have been most successful and why. The study is expected to take a year to complete.

Even with minimal direction from the top, Ramias is clear on the corporate goals that his efforts support. He emphasizes a change in culture and the related push for greater quality. The statistical process control and design of experiments pushed hard by Keki Bhote and other corporate quality experts require a greater number of supervisors to manipulate statistics, and many workers to improve their arithmetic skills. And as a participative management structure spreads through operations, workers need to communicate better through writing and to learn group problem solving.

In 1987, Ramias ran a pilot program in Mesa, a suburb of Phoenix. All operators and technicians were tested to determine their reading and math levels, and then assigned to teaching programs that lasted 10, 20, or 30 hours. Some workers tested out of the program, but for the others, training was required. It was considered part of the workers' jobs with Motorola, and the East Valley trainers reinforced this impression by holding all classes during work hours. Ramias thinks that this attitude improved the motivation of the students, and helped remove the stigma of taking "remedial" classes.

Ramias was excited about the results. "We had remarkable success in comparison with the public schools. The reason is that the training was directly tied to the workers' jobs. For reading and math materials, we used only specifications, blueprints, and other work-related materials." During the short program, many participants were able to raise their grades by one full level. This result supports commentary by every training expert we talked to: The most effective training is tied tightly to the workers' needs and experiences.

Although the pilot program wound down in 1988, training throughout the East Valley has been stepped up. Workers are funneled into the program largely through the Training Planning Process, a departmental supervisory review of workers. The supervisor assesses the worker's needs, and training is assigned accordingly. This system allows the supervisor to coordinate the training needs of his whole area of responsibility, and training is often assigned to entire teams of workers. This is increasingly common, Ramias said, due to the shift to participative management.

To support its training programs, East Valley has invested in a sizable

training center with auditoriums and classrooms, in which classes are held around the clock. The teachers are technology specialists, full-time trainers from Ramias' staff, and in-house experts from various functional departments. In addition, they have set up self-paced learning for technicians, and new training matrixes are continually being developed. This training is tied to promotional opportunities.

The financial commitment to such an extensive program is in line with that found throughout Motorola; Ramias estimates the total annual corporate budget at $18 million. Although the overall training costs are large, the costs of training an individual worker are often only about $100 per day.

The corporate testing budget is far smaller, according to Nancy Ruf, corporate director of testing. Still, testing is being given increasing attention at Motorola. A lawsuit in the mid-1970s convinced Motorola to abandon all job testing. Ruf says that the company overreacted, and that in fact the real issue was not testing but applicant flow: corporate headquarters are in a northern suburb of Chicago, and many blacks, concentrated on Chicago's South Side, had no effective transportation to the site. According to Ruf, "the problem was not our testing program, but the city's geography."

That testing and assessment "moratorium" ended two years ago, leading to the creation of Ruf's department and its counterparts in the individual Motorola companies. The testing area is an exception to Motorola's decentralized structure. Because of the legal implications and the long hiatus when testing was taboo at the company, "top management wanted more corporate oversight at this point," Ruf said. There are sector managers of testing in each division, but testing for the purposes of hiring and promotion, especially hiring, is closely supervised by the corporate department. Ruf is less interested in tests for training assessment, because the tests are legally neutral; workers are neither rewarded nor punished for their performance on them.

At present, all new hires are tested in reading and math, in visual acuity, and in forms completion. The tests used for training assessment are different in each location. Often, training is set up with the cooperation of local colleges, and the instructors are encouraged to use tests with which they are most familiar. In most cases, testing is not tied to promotion, especially in the manufacturing area. It only occurs when workers are moving from traditional manufacturing to newer, more high-tech systems that require substantially different skills. According to Ruf, this presently affects "only a handful" of employees.

Ramias' East Valley facilities are an exception. Involved as they are

in semiconductor production, they have aggressively pursued cutting-edge technology, and so they have had to develop extensive testing and training programs in a hurry. Ruf agrees that the time will come when many more employees throughout Motorola will face the same challenges.

Motorola develops all of its tests in house. At one time, tests were purchased from a national vendor, but when it was discovered that the vendor was not guarding the tests with sufficient care, Motorola decided to develop their own. These are now kept in a double-locked drawer.

Ruf's primary responsibility, at present, is to develop a methodology to determine whether a selection test is valid. A valid test is one that accurately tests the trait or skill that the company wants to assess. The first step in developing a new test is to study the job, in order to determine the skills needed to perform it well. A test is then developed and a validation study done. Finally, incumbents are tested and their performance is evaluated, generally by their supervisors. A good test will predict the performance of current employees accurately. The last step is the critical one; the test "must be tied back to the job."

A validation study can cost anywhere from $25,000 to several hundred thousand dollars. According to Ruf, "the costs are minuscule in comparison to the payback." Testing costs are also quite small when compared with the costs of training.

Motorola is investing in testing again, despite the apparent legal risks, because of the widening gap between the skills available in the applicant pool and those needed to do increasingly complex jobs. According to Ruf, this gap will widen. She says that many managers have a gut feel for the changing technology of the future, but that many somehow assume that they will be able to hire new workers to handle the technology. She feels that such managers are burying their heads.

"Human resources people can't wait for managers to encourage them to go out and develop programs that look to the future," she warns. "They have to go out and look for the long-term trends in population and in industry. As every one who has read *Workforce 2000* knows, the trend to the end of the century and beyond is towards a less skilled labor pool, at a time when industry needs will be for highly skilled workers. By undertaking training and testing programs now, we are avoiding future problems."

Like Tom Fordonski and Al Ramias, Ruf emphasizes that the present workers are well qualified to do the jobs they were hired for. But as so many experts have written, many of them will need more education to do the jobs of the future. At Motorola, that future has already arrived.

4

Organizing the Response

HRD Department, Inc. grew out of the Onan Corporation's training programs (see Chapter 3). Brian Murphy and Susan Peterson worked in Onan's training and development department in the early 1980s, and were instrumental in the design and implementation of Onan's courses.

Mr. Murphy and Ms. Peterson have since ventured out on their own, founding HRD Department, Inc., a St. Paul–based consulting firm. They concentrate on training needs assessment, supervisory programs, and job skills training systems. For an electrical enclosure manufacturer, they set up and conducted extensive training programs at locations in the United States and the United Kingdom. At a life insurance company, they implemented a series of programs and services to support career development. At an electrical utility, they evaluated instructional staff, course materials, and training structure.

In this chapter, Mr. Murphy and Ms. Peterson share their expertise by providing us with a discussion of basic skills needs assessment and program implementation.

In addition, Mr. Murphy has organized a detailed checklist of the steps to take in creating a training system. Any such checklist must be

adapted to fit individual situations, but Mr. Murphy's submission may serve as a valuable guide. The checklist begins on page 59, following this general discussion.

Finally, our contributors offer three additional assessment tools developed for a recent client: an initial discussion outline for senior managers, an introductory meeting outline for production managers, and an employee training needs questionnaire. These working samples begin on page 64, following the checklist.

WHY IMPLEMENT A BASIC SKILLS PROGRAM?

by Brian Murphy and Susan Peterson

Basic skills in the workplace is a topic fraught with strong feelings about public and private policy. There is general agreement that many employees and job applicants lack certain fundamental skills; however, few agree why the deficiencies exist, or who should act to correct the situation.

Organizations are faced with constant skills deficiencies that may range from the inability to operate complex machines down to being unable to read simple instructions. Like it or not, companies carry the burden of closing the gap between the skills *needed* to perform such tasks and those *available* in the workforce. Here, we explain how to close that gap by implementing an effective basic skills program.

Let's differentiate between *basic* skills and *job* skills. *Basic* skills are common to most jobs found in a company, although skills considered "basic" in one company may be defined as "advanced" in another. *Job* skills apply to one or a set of similar work activities. For our purposes:

- *Education* classes are those used to develop basic skills; and
- *Job training* sessions are those used to develop job skills.

These distinctions are crucial. If they are not stated early and consistently, problems are bound to arise in every aspect of a program.

Business Needs

The drive to develop basic skills in a company ought to go beyond the sense that "it's a good thing to do." Although some business people may choose to be civic-minded, supporting basic skills classes where no business need exists, this rarely provides sufficient impetus to

build a successful program. There must be bona fide organizational need — for example, changes in the business line, or new uses of technology, methods, or processes.

Growth in sales or the volume of work are typical factors that stimulate the need for basic skills. Growth means internal promotions, added employees, increased job responsibilities, and more sophisticated systems and procedures. Performance requirements change dramatically as a company expands.

Technology is another obvious trigger for basic skills requirements. Changes in this arena most often entail computers or automated machinery on the shop floor. Employees can experience rapid transitions from "hands-on" contact with machines and materials to "hands-off" data entry and systems monitoring, even for the same products or services. The use of more sophisticated tools and equipment can reveal previously undetected basic skills deficiencies.

More subtle basic skills requirements can emerge from changes in work methods or processes. Increased job responsibilities often lead to completely new work tasks. For example, initiating statistical process controls may require knowledge of algebra, where previously the job demanded no more than simple counting. Asking employees to work in teams may demand fundamental interpersonal skills never before required.

Ultimately, any education or training program within a company succeeds if it satisfies a business need. The first task, then, is to pinpoint the underlying *reason* for considering a basic skills program. Interviews with key managers will provide the most information about what has changed or will change within the business.

Basic Skills vs. Job Training Needs

The next step involves distinguishing between developing basic skills and satisfying job training needs. Every business need does not produce a *skills* need. Yet, most skills deficiencies arise when there is a difference between skills required in the past and those needed in the present. It is important to assess the nature of skills discrepancies as they apply to the business over time. *Fundamental* changes tend to produce more basic skills needs. *Day-to-day* operational changes tend to produce job training needs, such as teaching new employees the skills necessary to their present jobs.

An obvious place to start is by examining performance problems. Skills

deficiencies surface when goals and standards are not met. Identifying problems that apply across several jobs or employee groups helps to determine if a basic skills component exists. Performance problems associated with business needs can further reinforce the case for developing basic skills.

The strengths and weaknesses of employee groups offer other clues. Are there any patterns of skills deficiencies associated with particular *types* of employees? When did these patterns appear? Many times basic skills needs emerge within definite employee groups, especially where the scope and content of jobs has been changed by the company. In addition, these patterns may appear after changes in hiring practices, or in the available supply of qualified job seekers.

Developing basic skills through education classes prepares employees for a *variety* of job training activities, while job training readies an employee for a *specific* job. Keeping basic skills training separate and distinct from job training promotes nonthreatening preparation for later training. And, conversely, eliminating basic skills content from job skills development keeps job training both manageable and cost-effective. It keeps the courses interesting for employees, too.

It is entirely the company's responsibility to mark the distinction between basic skills and job training. This can be accomplished by defining which skills are "basic" and which skills are job-specific. This is an individual matter: Company A may determine that "computer literacy" is a basic skill after installing a new computer system, while Company B may consider this skill applicable only to its data processing department.

Plans

Next, plans must be developed for implementing a program. Management needs to define and monitor the desired range of skills. Employees need a map to chart their skills development. These are the reasons for education and training plans. Without plans, education and training becomes nothing more than a series of programs that eventually drift away from bona fide business needs.

Differentiating between *education* and *training* programs is an early planning concern. What basic skills are necessary? How do they prepare employees for job training? Are there any particular relationships between progression within basic skills and progression within job training? The example in Exhibit 10 shows how machine operator jobs may require a range of basic math skills, based on and related to the progression of job tasks.

EXHIBIT 10

Basic Skills — Mathematics	*Job Skills — Machine Operators*
addition & subtraction	machine set-ups
decimals & fractions	production machining
algebra	blueprint reading
geometry	statistical process control
trigonometry	geometric dimensioning

Relationships Between Basic Skills and Job Skills: The basic skills on the left are necessary to the job skills on the right. Education in basic skills must precede training in job skills.

The full range of learning activities must be identified in any plan. Often, that range is governed by the magnitude of change in the business or in the labor supply. One plan may call for basic reading skills, while another may start at the level of reading technical notes. Also, the amount of detail for each education and training activity should be indicated. For example, Company A offers Shop Math classes, while Company B has a series of courses that includes Math I, Math II, Algebra, and Basic Statistics.

Procedures

Often overlooked are the procedures governing how, when, and where to implement a basic skills program. A company may have conducted a lot of job training, but developing basic skills presents new considerations. Are basic skills courses offered on- or off-hours? Does the employee pay for any portion of the class? Should job applicants attend classes prior to starting employment? What happens if employees are found to lack basic skills for their jobs?

These and many other personnel questions require systematic review before implementing a basic skills program. One special consideration applies to current employees. Changes in a business invariably mean changes to jobs and to the individuals who fill those jobs. Employees learn quickly about the implications and consequences of change. Fear and resistance often result. "Grandfathering" — policies that categorize current workers according to their prior job levels, and

guarantee that those levels will be maintained -- can help reduce concerns about losing jobs, income, or self-respect.

Other procedures can explain how employees enter and complete courses. What type of registration is required? Do any courses require prior skills? Can an employee quit -- and if so, what happens? What recognition or rewards, if any, are offered for successful completion? These are but a few examples of the many "what if's" that must be addressed at the outset.

A final set of procedures should cover administrative topics. How do employees enroll -- over the phone, through sign-up sheets, or by invitation? To what departments and budget line items are expenses charged? Is paid employee time in classes to be charged against the program? How are employee instructors paid, if at all, above and beyond their current salaries? Having an approved, published set of procedures adds greatly to a consistent and problem-free implementation.

Education and Training Activities

Each activity, whether it be a class, seminar, practice session, or on-the-job experience, should have written specifications. They need not be lengthy or detailed; however, it is prudent to prepare objectives and identify the particulars of instruction. A simple one-page content outline and a brief explanation of preferred training methods provide crucial information for instructors. Lists of materials, facilities, and equipment requirements are important as well.

The company is best equipped to determine how much or how little instruction ought to be given in a particular course. Many organizations have certain norms or methods of treating employees; they should also be addressed at this point. Although well intentioned, many outside instructors miss the mark when asked to conduct a course. With little or no knowledge about the company or its employees, such instructors tend to cover too much, too quickly.

Goals and Schedules

Every program has a life span. We consider it unlikely that the same basic skills classes will be required forever. In fact, it is far more likely that the business itself will change, precipitating another set of skills requirements at some future date. Therefore, goals and schedules are in order.

Goals for a basic skills program should identify the number of employees who might (or will) participate, the frequency and location

of classes, and anticipated costs. Having these reference points allows comparisons and later evaluations.

Like procedures, scheduling considerations are often overlooked. Yet a variety of factors greatly affect the success of a program. Managers should give careful attention to schedules, so that they allow for fluctuations in the business, summer vacation periods when staffing levels may be low, and the ongoing availability of instructors. Every oversight (such as making classes too long, or offering them at inconvenient locations) can severely deter participation.

Communications are crucial to the success of a program. Employees must know exactly why classes are offered, and how the classes relate to the company's work. Each trainee should understand the rewards of participation.

Instruction

Instructors are in good supply. Employees, local teachers, retirees, volunteers, contractors, training vendors, and consultants are readily available. But they require a good plan, some reasonable specifications, and a set of procedures. When an instructor knows exactly what the employees need, instruction usually succeeds. But, as we warned earlier, instructors who lack any sense of the business needs of the organization, or the on-the-job applications of what they're teaching, are a risky proposition.

Books, manuals, videos, and computers are used regularly in instruction. Many excellent materials exist to support basic skills programs. But "support" is the key word. When used to augment instruction, these materials are quite helpful. As stand-alone pieces, video "talking heads" or computerized self-instruction programs often fail.

Feedback

As with any endeavor involving people, ongoing feedback helps reinforce goals and provides information for future improvements. It is prudent to ask employees about their experiences and concerns. Comments from instructors give insights into employee learning needs. Supervisors are excellent barometers of short-term progress, while the program's own stated goals give indications of long-term success.

Finally, a periodic reexamination of the original business needs will suggest future actions. Learning takes time, especially where basic

skills are involved. Consequently, programs in this arena ought to be considered an integral part of a company's long-term strategy -- a "research and development" program for its own workforce.

NEEDS ASSESSMENT CHECKLIST

A. Questions to Answer Early in the Process

Points to address with key managers (executives with profit-and-loss responsibilities) concerning the business and how it is (or will be) operating:

1. What are the reasons for the proposed program?

    a. Growth.
    b. Technology change.
    c. Change in management style (e.g., to participative management).

2. Do we need basic skills training (education) or technical training, or a combination?

B. Collecting Information for the Needs Assessment

How to collect the needed information on the present abilities of the workforce and the changing demands of their jobs:

1. Focus groups with employees. Groups of ten to fifteen workers at a time, each group drawn from a different functional area. The focus group should generate this information:

    a. What kinds of skills are needed by *everyone* covered in the assessment?
    b. What general skills are needed in your functional area?
    c. What are the common tasks you perform on the job?
    d. Where do people have difficulties doing their jobs?

2. Meetings with personnel or administrative managers first and then with operating managers who will likely pay for services.

    a. Do the workers want or need *education* or *job training*?
    b. What classes do they need?
    c. How should training be structured? (on- or off-hours, with tests and grades or not, should they be asked to pay for any

part of the program, should courses be directly related to promotions or pay increases? and so on.)

3. Individual interviews with supervisors in each functional area. The information to be gathered includes:

   a. What skills or job tasks present problems for employees? Do they go away over time?
   b. How well qualified are new hires? How much turnover is there and why?
   c. Are employees using new or different tools or processes; how recent are the changes?
   d. Are there any communication or organizational problems that affect job skills?

4. An anonymous questionnaire, distributed to nonexempt workers. It might give lists of skills and ask whether workers have them. Or it might ask what courses they had in school, and how many years of them they had. The initial training needs questionnaire at Onan had these sections:

   a. Education level reached.
   b. The number of courses completed in math, science, and vocational/industrial subjects.
   c. Courses that the respondent would like to take, or take over again.
   d. Self-ratings of ability to communicate: to lead a group, to write memos, and so on.
   e. Self-ratings of reading: newspapers, manuals, etc.
   f. Self-ratings on ability to perform a long list of job-related skills, such as:

      i. ability to use decimals, balance equations.
      ii. ability to measure using Vernier calipers, steel rulers, volt/ohm meters.
      iii. ability to read blueprints and specifications.
      iv. various computer skills.
      v. read wiring diagrams, wire circuits.
      vi. troubleshoot.

   g. Evaluation of each respondent's role in the company, and an open-ended request for suggestions about training at the company.
   h. Examination of job descriptions to determine the basic skills common to all or most employees.

C. Identifying the Key Factors, or Issues, That Impact on Planning

1. Summarize and critique data collected from interviews and questionnaires to look for patterns and trends. For example:

   a. Do problems with certain skills come up repeatedly, such as making calculations?
   b. Are certain skills commonly absent in new hires, such as understanding computers?
   c. Are there patterns of "dumb" or "silly" mistakes that require the use of some common skill, such as reading instructions?

2. Brainstorm possible causes for skills not being present or used:

   a. No evidence of skills in question.
   b. Employees have skills but cannot or will not use them (management issues).
   c. The work has changed but the job has not.

3. There will generally be between five and 20 major factors to consider. Examples:

   a. Personnel policies such as overtime, job progression, access to courses, records of employee participation, etc.
   b. Communications issues such as how much information to provide about the business and its present and future skills needs.
   c. Administrative concerns such as how, when, and where classes are conducted and how employees register and complete courses.
   d. Business topics such as the feasibility of educating employees to eliminate problems or make improvements.
   e. Cost considerations such as the availability of resources (money, employee time, and facilities) from the business and from other sources (schools and government).

4. The training designers should avoid providing a "one best answer" to upper management. When the factors have been identified, management will have to weigh them according to the business needs the program is meant to fulfill. This will determine program structure.

D. Planning

Without plans, education and training becomes nothing more than a series of programs that eventually drift away from bona fide business

needs. These are the issues that must be addressed:

1. Differentiate between education and training programs.

   a. What basic skills are necessary in order to prepare employees for job training?
   b. Is there a relationship between progression in basic skills and progression in job training?
      (To determine, code information from questionnaires and from supervisor interviews. Exhibit 10 shows how machine operator jobs may require a range of basic math skills based on and related to the progression of job skills.)
   c. The depth and detail of the program must be determined. For instance, one company might offer Shop Math, while another might offer Algebra I, Algebra II, Geometry, and Basic Statistics.

E. Program Procedures

Often overlooked in the planning stage are the procedures governing how, when, and where to implement a basic skills program. These issues can impact greatly on the program's success. There are many questions that must be answered, of which the following are only a few:

1. Are basic skills courses offered on- or off-hours?

2. Does the employee pay for any portion of the class?

3. What happens if someone doesn't complete a class?

4. Procedures must also be established for entering and exiting classes:

   a. Do any courses require prerequisite classes?
   b. Can an employee quit, and if so, what happens?

5. Finally, how will future changes to the program be instituted?

F. Design

For presentation to participants, the design should consist of 2-3 pages of explanation. Later, specifications detailing each training activity within each segment should be prepared for vendors (instructors, schools, etc.).

1. The structure of the program should be described to show:

a. Scope and sequence of courses.
b. Entry and exit options.
c. General rules for participation.

2. Design specifications should give details for persons providing instruction and be 1-2 pages:

   a. Course objective.
   b. Content outline.
   c. Instructional method.
   d. Length of class meetings, number of sessions.
   e. Supplies and materials.
   f. Instructional materials.

3. Instructors can come from local vocational schools, vendors, and in some cases, the workforce itself.

4. Training materials can come from vendors, the local instructors, or be developed in-house. Often the best solution is to adapt instructors' materials by substituting in job-specific examples, such as company manuals, product blueprints, and so on.

ADDITIONAL ASSESSMENT TOOLS

Among HRD's recent clients is the Thermo King Corporation, a Minnesota manufacturer of refrigeration equipment. Like many U.S companies facing increased competition, Thermo King needed to ensure that its workforce had the skills to produce high-quality, competitively priced products. As a result, it is introducing automated manufacturing equipment into its manufacturing processes.

Rather than trying to hire new workers with higher skills levels to improve quality, decrease costs, and implement automated manufacring, Thermo King has undertaken extensive programs to train its 390 employees, in consultation with HRD Department, Inc. After a careful needs assessment, HRD designed a three-tiered program of training in basic skills, workplace skills, and job skills. The first course offerings, with 189 registrations (nearly half the workforce), were judged a success,.

What follows are excerpts from assessment tools that HRD used in its work with Thermo King. They are intended to provide in close detail the information that a training designer must collect, and how it ought to be done. They are:

- An outline for initial discussion with key managers, which was to be used to direct further assessment efforts and to help HRD start to sketch in some of the broad outlines of the program. A secondary purpose is to build a feeling of ownership of the program in the minds of key managers. Bringing them in from the start helped to encourage support of the training efforts.
- An outline of the introductory meeting for production managers and supervisors, which took place after initial interviews were completed. During this meeting, HRD's Brian Murphy discussed how the assessment would be done, answered questions, and started to solicit supervisor suggestions and comments.
- An excerpt of the lengthy questionnaire that was used to gauge worker needs, interests, and attitudes toward training and education. It provides a model of how such a questionnaire may be constructed. Obviously, there are other possibilities.

The management of Thermo King requests that any inquiries concerning training be directed to the American Management Association or to HRD Department, Inc.

I. Outline for Discussion With Key Managers

The HRD Department's objective is to conduct interviews with key managers to gather information about general training needs at the Minneapolis manufacturing facility. These initial interviews are intended to be open-ended, so that all aspects of training and development can be explored.

The initial set of interviews will help identify general patterns, trends, and issues that apply to training. From the interviews, more detailed and specific assessment strategies will be developed. Assessment information will then be used to develop plans for training that are consistent with company objectives and policies.

As a key manager, you are asked to discuss the following topics during a 30- to 60-minute interview with the two principals of the HRD Department, Inc., Susan Peterson and Brian Murphy.

- General training needs that you judge to be important for current and future operating needs for employee groups, such as:

— hourly production workers.
— office personnel.
— technical professionals, such as engineers.
— managers and supervisors.

- Company policies and practices that may affect training.
- Your philosophy concerning the development of employees.
- Business conditions (current and anticipated) that have an impact on training employees.
- Specific training topics that you would like to see covered.
- Your listing and assessment of past training efforts, highlighting notable successes and limitations.

Ms. Peterson and Mr. Murphy will be prepared to open and guide the interview as appropriate. You are encouraged to offer whatever input, comments, recommendations, and suggestions you deem important.

Thank you for your help.

II. Outline for Discussion with Production Managers and Supervisors

An assessment will soon be conducted of the training needs of hourly employees at Thermo King. It will involve meetings and interviews, especially with shop employees. The HRD Department will start the process with a two-hour introductory meeting for production managers and supervisors to cover the topics outlined below:

Assessment Plan: The steps planned for the assessment. How, when, and where information is collected. Times to review and critique findings and recommendations.

Job Skills Training Options: A presentation of the options available for job skills training, introducing key factors such as:

Scope and Sequence

- mix of education and job training topics
- amount and detail of training activities
- sequence of training

Procedures

- how and when training is conducted
- how and when employees participate

Documentation

- format of training plans, outlines, etc.
- amount of detail

Trainers

- who conducts training
- methods used by trainers

Supervisor Comments and Questions: Specific areas of interest or concern to supervisors. Suggestions about where to start and what to look for in the shop. Questions and answers about job training.

Shop Floor Orientation: After the meeting, supervisors are asked to spend some time with Brian Murphy and show him around their departments to begin the assessment.

III. Training Needs Questionnaire

Introduction: Hello. This survey is designed to identify training needs for Thermo King's Minneapolis manufacturing operations. The survey will help define training topics that are important to you. Also, the survey will assist in determining the best procedures for running a training program. . . .

Your responses are STRICTLY CONFIDENTIAL. There is no way that any survey will be used to identify any employees. So, you are asked to be frank and open with your responses. You will be told about the results of the survey in the very near future.

If you do not understand some part of the survey or have trouble completing the survey . . . ASK A FRIEND FOR HELP IN COMPLETING THE SURVEY.

If you know of someone who might need assistance completing the survey . . . OFFER YOUR FRIEND HELP IN COMPLETING THE SURVEY.

[The next section of the survey asks the worker to provide background information on his or her department, labor grade, age, and tenure at the company. Following this is a set of instructions for completing the rest of the questionnaire:]

Please respond to each item that apples to you. For example:

1. If you are able to perform the skill, check the CAN DO box.
2. If you use this skill at work, check the USE NOW box.
3. If you can't perform the skill but want to learn it, or if you have the skill but want to improve it, check the WANT TO LEARN OR IMPROVE box.

4. If you don't have the skill and do not want to learn it, leave all boxes BLANK.

[Three sections follow. The first, BASIC SKILLS, asks respondents to rate themselves on ability to read shop memos, perform arithmetic, use geometry and algebra, and so on. There are nine questions.]

[The second section, WORKPLACE SKILLS, asks about skills, such as understanding how computers work and how they are used on the job, understanding the basic principles of refrigeration (Thermo King's industry), and reading blueprints.]

[The next section, JOB SKILLS, asks about the workers' ability to perform a long list of specific skills used in the plant -- setting up and operating equipment for processes like tube bending and spot welding, troubleshooting machine or assembly problems, maintaining shop and department records. In all, the survey asks about 57 different skills.]

[A final section addresses worker attitudes toward training and toward their work environments. It asks about preferences for the structure of the courses, where and when they should be held, whether the respondent believes that he or she needs new skills to do the job, who training is likely to benefit, and so on.]

Afterword

In September 1989, *The New York Times* reported that "several companies," among them such *Fortune* 500 firms as the Ford Motor Company and the Quaker Oats Company, "have established interactive video kiosks where employees can obtain information on benefits and company issues."

The ARCO Corporation, based in Los Angeles, maintains a 24-hour telephone hotline that runs a looped tape recording of the daily company news. By pressing buttons on a touch-tone telephone, a caller may receive more detailed information on various corporate policies and plans.

The Sony Corporation has developed a prototype home television receiver that simultaneously records dozens of concurrent broadcasts, which viewers may call onto the screen at a time of their own choosing. Using this technology, cable news networks can "layer" their programming. The result: After watching a headline service, the home audience may opt for more detailed information on stories of particular interest, delving ever more deeply into the background of a current news item.

What has all this to do with workplace literacy?

Let's define the current problem at its root. Management must deliver information to workers. That information may concern policies and procedures, benefits structures, instruction in the use of new technology, or simply the date of the company picnic.

Today, and for the foreseeable future, management encounters difficulty in communicating with the workforce because some workers *cannot* read, and many more workers simply *do not* read.

(Similarly, producers of consumer goods spend millions on consumer hotlines, only to find that a majority of calls involve instructions that are clearly provided on their product packaging or in manuals that come with the purchase -- but that consumers *do not read* these instructions.)

So the task is to deliver information, and the problem is the lack of reading skills. The obvious solution: Teach people to read. This report gives numerous examples of successful attempts to provide this solution.

But there is a less obvious solution -- one more innovative, more daring perhaps, but equally promising if not, in the long run, *more* promising. And that is to deliver the necessary information in a form other than the written word.

Mass literacy is a new phenomenon in human history. As much as anything, it resulted from a technological breakthrough: Gutenberg's invention of moveable type. Words that had previously required laborious copying by cloistered scribes could now be reproduced cheaply and efficiently by the printing press, and a population eager for information had only to learn to read in order to have it.

But people had always received information. It traveled by the spoken word. It was delivered by preachers and orators to mass audiences, and in simple conversation and demonstration between teacher and student.

And, in fact, people in the pre-literate age were better listeners than they are today. We are astonished to learn that Sunday sermons and political speeches commonly ran for two hours or longer in past centuries. But people listened -- because they valued the information.

It is not too much to say that the 21st century will herald the dawn of the post-literate age. By this, we mean to say that reading and writing skills will become more exclusive (while as in all ages there will remain a literate elite). But there will arise -- there have already arisen -- new forms of literacy: *video* literacy, *audio* literacy.

The generation raised on television, radio, and disk and tape recordings is more skilled than its elders in both transmitting and receiving information via the electronic media. It is more attuned to the symbols and signs on a video screen; it is more expert in extracting meaning from rock lyrics that remain incomprehensible to older folks.

And how great is the scope of the new technology! In the pre-literate age, the near horizon defined the borders of available information. In the post-literate age, there are no borders: information travels with the speed of light from every corner of the globe, indeed from the furthest reaches of the solar system. Everyone who wished it could see the moons of Saturn as the Voyager spaceship broadcast their images back to Earth.

Ford, Quaker Oats, and ARCO have taken the first tentative steps in communicating with the workforce in the post-literate age. They have decided that if people can't or won't read to receive necessary information, they will deliver that information in a more accessible form.

The initial installation of video posts in the workplace, the transformation of computer screens into interactive video stations, and the inauguration of telephone messaging networks are expensive propositions. It will prove costly to produce software and/or programming for these new elements — certainly more costly than printing and distributing revised pages for a policies-and-procedures manual.

But the reality is that most people don't *read* those revisions as they flow across a work desk. And it is not expensive to produce a daily tape recording, as ARCO does, to make information readily available, via telephone, to employees at headquarters and remote locations.

The task is communication. Information should be accessible to the widest audience. New forms can make it so.

Certainly, the work of the future will require people to read, write, and perform calculations. Still, the one specific point emphasized by all of our experts and practitioners is that instruction in these skills must be *directly related* to the job at hand if training is to succeed.

"Suit the action to the word, the word to the action," wrote Shakespeare — a phrase he intended to be *spoken* by an actor, not read off the page. "Suit the training to the job, the job to the training," our experts advise — a guideline that applies equally to workplace testing in basic skills.

Appendix

Table 1 The AMA Sample: By Annual Sales and Business Category

Table 2 Policies for Testing in Basic Skills Proficiency

Table 3 Action When Testing Reveals Deficiencies

Table 4 Years of Program Operation; Cost of Testing in 1988

Table 1: The AMA Sample: By Annual Sales and Business Category

1988-89 AMA SURVEY ON BASIC SKILLS TESTING

	WHOLE SAMPLE	ANNUAL SALES: LESS THAN $50M	ANNUAL SALES: $50M TO $500M	ANNUAL SALES: MORE THAN $500M	BUSINESS CATEGORY: BANKING, FINANCE, INSURANCE	BUSINESS CATEGORY: EDUCATION	BUSINESS CATEGORY: GOVERNMENT & MILITARY	BUSINESS CATEGORY: HEALTH CARE & MEDICAL	BUSINESS CATEGORY: MANUFACT., CONSUMER GOODS	BUSINESS CATEGORY: MANUFACT., INDUSTRIAL GOODS	BUSINESS CATEGORY: PROFESS'N'L SERVICES	BUSINESS CATEGORY: OTHERS
	100%	443	384	148	86	71	72	110	97	200	92	277
ANNUAL SALES (OR BUDGET, IF NONPROFIT):												
LESS THAN $50 MILLION	443 44.1%	443 100.0%	0 0.0%	0 0.0%	21 24.4%	49 69.0%	33 45.8%	55 50.0%	30 30.9%	78 39.0%	61 66.3%	116 41.9%
$50 MILLION TO $500 MILLION	384 36.2%	0 0.0%	384 100.0%	0 0.0%	30 34.9%	17 23.9%	23 31.9%	42 38.2%	44 45.4%	85 42.5%	24 26.1%	99 35.7%
MORE THAN $500 MILLION	148 14.7%	0 0.0%	0 0.0%	148 100.0%	27 31.4%	3 4.2%	10 13.9%	5 4.5%	18 18.6%	31 15.5%	3 3.3%	51 18.4%
NO ANSWER	50 5.0%	0 0.0%	0 0.0%	0 0.0%	8 9.3%	2 2.8%	6 8.3%	8 7.3%	5 5.2%	6 3.0%	4 4.3%	11 4.0%
BUSINESS CATEGORY: AGRIBUSINESS/FOOD PROCESSING	30 3.0%	8 1.8%	14 3.8%	8 5.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	30 10.8%
BANKING/FINANCE	54 5.4%	11 2.5%	19 5.2%	17 11.5%	54 62.8%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
COMMUNICATIONS/PUBLISHING	25 2.5%	13 2.9%	10 2.7%	2 1.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	25 9.0%
CONSTRUCTION	20 2.0%	9 2.0%	8 2.2%	3 2.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	20 7.2%
EDUCATION	71 7.1%	49 11.1%	17 4.7%	3 2.0%	0 0.0%	71 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
ENTERTAINMENT/RECREATION/LODGING	26 2.6%	16 3.6%	6 1.6%	3 2.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	26 9.4%
GOVERNMENT/MILITARY	72 7.2%	33 7.4%	23 6.3%	10 6.8%	0 0.0%	0 0.0%	72 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
HEALTH CARE/MEDICAL	110 10.9%	55 12.4%	42 11.5%	5 3.4%	0 0.0%	0 0.0%	0 0.0%	110 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
INSURANCE	32 3.2%	10 2.3%	11 3.0%	10 6.8%	32 37.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
MANUFACTURING: CONSUMER GOODS	97 9.7%	30 6.8%	44 12.1%	18 12.2%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	97 100.0%	0 0.0%	0 0.0%	0 0.0%
MANUFACTURING: INDUSTRIAL GOODS	200 19.9%	78 17.6%	85 23.4%	31 26.9%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	200 100.0%	0 0.0%	0 0.0%
MINERAL EXTRACTION/PROCESSING	18 1.8%	5 1.1%	6 1.6%	7 4.7%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	18 6.5%
PROFESSIONAL SERVICES	92 9.2%	61 13.8%	24 6.6%	3 2.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	92 100.0%	0 0.0%
WHOLESALE TRADE	20 2.0%	8 1.8%	9 2.5%	2 1.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	20 7.2%
RETAIL TRADE	31 3.1%	13 2.9%	13 3.6%	3 2.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	31 11.2%
TRANSPORTATION/DISTRIBUTION	34 3.4%	10 2.3%	13 3.6%	8 5.4%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	34 12.3%
UTILITIES	45 4.5%	12 2.7%	17 4.7%	15 10.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	45 16.2%
OTHER	28 2.8%	22 5.0%	3 0.8%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	28 10.1%

Table 8: Policies for Testing in Basic Skills Proficiency

1988-89 AMA SURVEY ON BASIC SKILLS TESTING

		ANNUAL SALES			BUSINESS CATEGORY							
	WHOLE SAMPLE 1005	LESS THAN $50M 443	$50M TO $500M 364	MORE THAN $500M 148	BANKING, FINANCE, INSURANCE 86	EDUCATION 71	GOVERNMENT & MILITARY 72	HEALTH CARE & MEDICAL 110	MANUFACT., CONSUMER GOODS 97	MANUFACT., INDUSTRIAL GOODS 200	PROFESSIONAL SERVICES 93	OTHERS 277
TEST FOR BASIC SKILLS PROFICIENCY	345	146	121	55	40	19	32	27	27	75	31	94
	34.3%	33.0%	33.2%	37.2%	46.5%	26.8%	44.4%	24.5%	27.8%	37.5%	33.7%	33.9%
SELECTED CURRENT EMPLOYEES: LITERACY & MATHMATICS	39	15	15	9	2	0	3	4	6	8	2	14
Pct. of all:	3.9%	3.4%	4.1%	6.1%	2.3%	0.0%	4.2%	3.6%	6.2%	4.0%	2.2%	5.1%
Pct. of those that perform any testing:	11.3%	10.3%	12.4%	16.4%	5.0%	0.0%	9.4%	14.8%	22.2%	10.7%	6.5%	14.9%
LITERACY ONLY	11	8	3	0	0	1	1	2	0	3	0	4
Pct. of all:	1.1%	1.8%	0.8%	0.0%	0.0%	1.4%	1.4%	1.8%	0.0%	1.5%	0.0%	1.4%
Pct. of those that perform any testing:	3.2%	5.5%	2.5%	0.0%	0.0%	5.3%	3.1%	7.4%	0.0%	4.0%	0.0%	4.3%
MATHMATICS ONLY	11	5	3	3	2	0	0	1	1	5	0	2
Pct. of all:	1.1%	1.1%	0.8%	2.0%	2.3%	0.0%	0.0%	0.9%	1.0%	2.5%	0.0%	0.7%
Pct. of those that perform any testing:	3.2%	3.4%	2.5%	5.5%	5.0%	0.0%	0.0%	3.7%	3.7%	6.7%	0.0%	2.1%
ALL NEW HIRES: LITERACY & MATHEMATICS	62	22	22	9	9	3	4	2	5	13	10	16
Pct. of all:	6.2%	5.0%	6.0%	6.1%	10.5%	4.2%	5.6%	1.8%	5.2%	6.5%	10.9%	5.8%
Pct. of those that perform any testing:	18.0%	15.1%	18.2%	16.4%	22.5%	15.8%	12.5%	7.4%	18.5%	17.3%	32.3%	17.0%
LITERACY ONLY	33	15	16	1	0	2	5	4	0	8	3	11
Pct. of all:	3.3%	3.4%	4.4%	0.7%	0.0%	2.8%	6.9%	3.6%	0.0%	4.0%	3.3%	4.0%
Pct. of those that perform any testing:	9.6%	10.3%	13.2%	1.8%	0.0%	10.5%	15.6%	14.8%	0.0%	10.7%	9.7%	11.7%
MATHEMATICS ONLY	10	6	2	2	2	0	0	0	2	1	3	2
Pct. of all:	1.0%	1.4%	0.5%	1.4%	2.3%	0.0%	0.0%	0.0%	2.1%	0.5%	3.3%	0.7%
Pct. of those that perform any testing:	2.9%	4.1%	1.7%	3.6%	5.0%	0.0%	0.0%	0.0%	7.4%	1.3%	9.7%	2.1%
SELECTED NEW HIRES: LITERACY & MATHEMATICS	139	53	47	31	17	9	15	11	13	22	8	44
Pct. of all:	13.8%	12.0%	12.9%	20.9%	19.8%	12.7%	20.8%	10.0%	13.4%	11.0%	8.7%	15.9%
Pct. of those that perform any testing:	40.3%	36.3%	38.8%	56.4%	62.5%	47.4%	46.9%	40.7%	48.1%	29.3%	25.8%	46.8%
LITERACY ONLY	38	20	12	6	4	4	6	3	1	4	5	11
Pct. of all:	3.8%	4.5%	3.3%	4.1%	4.7%	5.6%	8.3%	2.7%	1.0%	2.0%	5.4%	4.0%
Pct. of those that perform any testing:	11.0%	13.7%	9.9%	10.9%	10.0%	21.1%	18.8%	11.1%	3.7%	5.3%	16.1%	11.7%
MATHEMATICS ONLY	56	27	18	7	9	1	3	8	4	18	3	10
Pct. of all:	5.6%	6.1%	4.9%	4.7%	10.5%	1.4%	4.2%	7.3%	4.1%	9.0%	3.3%	3.6%
Pct. of those that perform any testing:	16.2%	18.5%	14.9%	12.7%	22.5%	5.3%	9.4%	29.6%	14.8%	24.0%	9.7%	10.6%
ALL PROMOTION CANDIDATES: LITERACY & MATHEMATICS	7	4	1	2	0	1	0	1	0	3	0	2
Pct. of all:	0.7%	0.9%	0.3%	1.4%	0.0%	1.4%	0.0%	0.9%	0.0%	1.5%	0.0%	0.7%
Pct. of those that perform any testing:	2.0%	2.7%	0.8%	3.6%	0.0%	5.3%	0.0%	3.7%	0.0%	4.0%	0.0%	2.1%
LITERACY ONLY	4	2	2	0	0	0	1	1	0	1	0	1
Pct. of all:	0.4%	0.5%	0.5%	0.0%	0.0%	0.0%	1.4%	0.9%	0.0%	0.5%	0.0%	0.4%
Pct. of those that perform any testing:	1.2%	1.4%	1.7%	0.0%	0.0%	0.0%	3.1%	3.7%	0.0%	1.3%	0.0%	1.1%
MATHEMATICS ONLY	0	0	0	0	0	0	0	0	0	0	0	0
Pct. of all:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pct. of those that perform any testing:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SELECTED PROMOTION CANDIDATES: LITERACY & MATH	74	28	29	13	5	8	8	4	9	18	8	18
Pct. of all:	7.4%	6.3%	8.0%	8.8%	5.8%	11.3%	11.1%	3.6%	9.3%	9.0%	8.7%	6.5%
Pct. of those that perform any testing:	21.4%	19.2%	24.0%	23.6%	12.5%	42.1%	25.0%	14.8%	33.3%	24.0%	25.8%	19.1%
LITERACY ONLY	8	3	2	3	1	1	2	0	0	1	0	3
Pct. of all:	0.8%	0.7%	0.5%	2.0%	1.2%	1.4%	2.8%	0.0%	0.0%	0.5%	0.0%	1.1%
Pct. of those that perform any testing:	2.3%	2.1%	1.7%	5.5%	2.5%	5.3%	6.3%	0.0%	0.0%	1.3%	0.0%	3.2%
MATHEMATICS ONLY	25	10	9	3	2	0	2	2	4	10	0	5
Pct. of all:	2.5%	0.9%	0.0%	1.4%	4.7%	14.1%	0.0%	4.5%	4.1%	5.0%	0.0%	1.8%
Pct. of those that perform any testing:	7.2%	1.4%	0.0%	3.6%	10.0%	52.6%	0.0%	18.5%	14.8%	13.3%	0.0%	5.3%

Table 3: Action When Testing Reveals Deficiencies

1980-81 AMA SURVEY ON BASIC SKILLS TESTING

	WHOLE SAMPLE 1005	ANNUAL SALES: LESS THAN $50M 493	$50M TO $500M 364	MORE THAN $500M 148	BUSINESS CATEGORY: BANKING, FINANCE, INSURANCE 85	EDUCATION 71	GOVERNMENT & MILITARY 72	HEALTH CARE & MEDICAL 110	MANUFACT., CONSUMER GOODS 97	MANUFACT., INDUSTRIAL GOODS 200	PROFESSIONAL SERVICES 92	OTHERS 277
ACTION WHEN TESTING REVEALS DEFICIENCIES: CURRENT EMPLOYEES												
DISMISSAL	4	2	2	0	0	0	1	2	0	0	0	1
Pct. of all:	0.4%	0.5%	0.5%	0.0%	0.0%	0.0%	1.4%	1.8%	0.0%	0.0%	0.0%	0.4%
Pct. of those that test current employees:	6.6%	7.1%	9.5%	0.0%	0.0%	0.0%	25.0%	28.6%	0.0%	0.0%	0.0%	5.0%
OBLIGATORY REMEDIAL TRAINING	16	6	8	2	0	0	1	0	2	5	1	7
Pct. of all:	1.6%	1.9%	2.2%	1.4%	0.0%	0.0%	1.4%	0.0%	2.1%	2.5%	1.1%	2.5%
Pct. of those that test current employees:	26.2%	21.4%	38.1%	16.7%	0.0%	0.0%	25.0%	0.0%	28.6%	31.3%	50.0%	35.0%
REASSIGNMENT	9	6	2	1	0	1	1	1	1	5	0	0
Pct. of all:	0.9%	1.4%	0.5%	0.7%	0.0%	1.4%	1.4%	0.9%	1.0%	2.5%	0.0%	0.0%
Pct. of those that test current employees:	14.8%	21.4%	9.5%	8.3%	0.0%	100.0%	25.0%	14.3%	14.3%	31.3%	0.0%	0.0%
OTHER	8	3	1	4	1	0	0	2	0	2	0	3
Pct. of all:	0.8%	0.7%	0.3%	2.7%	1.2%	0.0%	0.0%	1.8%	0.0%	1.0%	0.0%	1.1%
Pct. of those that test current employees:	13.1%	10.7%	4.8%	33.3%	25.0%	0.0%	0.0%	28.6%	0.0%	12.5%	0.0%	15.0%
NO ACTION	15	8	3	4	2	0	1	1	3	1	1	6
Pct. of all:	1.5%	1.8%	0.8%	2.7%	2.3%	0.0%	1.4%	0.9%	3.1%	0.5%	1.1%	2.2%
Pct. of those that test current employees:	24.6%	28.6%	14.3%	33.3%	50.0%	0.0%	25.0%	14.3%	42.9%	6.3%	50.0%	30.0%
NO ANSWER	9	3	5	1	1	0	0	1	1	3	0	3
Pct. of all:	0.9%	0.7%	1.4%	0.7%	1.2%	0.0%	0.0%	0.9%	1.0%	1.5%	0.0%	1.1%
Pct. of those that test current employees:	14.8%	10.7%	23.8%	8.3%	25.0%	0.0%	0.0%	14.3%	14.3%	18.8%	0.0%	15.0%
ACTION WHEN TESTING REVEALS DEFICIENCIES: NEW HIRES												
NOT HIRED	275	120	96	46	35	17	23	21	21	56	28	74
Pct. of all:	27.4%	27.1%	26.4%	31.1%	40.7%	23.9%	31.9%	19.1%	21.6%	28.0%	30.4%	26.7%
Pct. of those that test new hires:	83.8%	87.0%	84.2%	83.6%	87.5%	89.5%	74.2%	80.8%	84.0%	86.2%	90.3%	81.3%
HIRED, ASSIGNED TO REMEDIAL TRAINING	7	3	1	2	0	0	3	1	0	1	1	1
Pct. of all:	0.7%	0.7%	0.3%	1.4%	0.0%	0.0%	4.2%	0.9%	0.0%	0.5%	1.1%	0.4%
Pct. of those that test new hires:	2.1%	2.2%	0.9%	3.6%	0.0%	0.0%	9.7%	3.8%	0.0%	1.5%	3.2%	1.1%
OTHER	26	8	8	5	4	0	1	1	3	3	2	12
Pct. of all:	2.6%	1.8%	2.2%	3.4%	4.7%	0.0%	1.4%	0.9%	3.1%	1.5%	2.2%	4.3%
Pct. of those that test new hires:	7.9%	5.8%	7.0%	9.1%	10.0%	0.0%	3.2%	3.8%	12.0%	4.6%	6.5%	13.2%
NO ANSWER	20	7	9	2	1	2	4	3	1	5	0	4
Pct. of all:	2.0%	1.6%	2.5%	1.4%	1.2%	2.8%	5.6%	2.7%	1.0%	2.5%	0.0%	1.4%
Pct. of those that test new hires:	6.1%	5.1%	7.9%	3.6%	2.5%	10.5%	12.9%	11.5%	4.0%	7.7%	0.0%	4.4%
ACTION WHEN TESTING REVEALS DEFICIENCIES: PROMOTION CANDIDATES												
PROMOTION DENIED	84	35	28	17	7	9	10	7	8	22	2	19
Pct. of all:	8.4%	7.9%	7.7%	11.5%	8.1%	12.7%	13.9%	6.4%	8.2%	11.0%	2.2%	6.9%
Pct. of those that test promotion candidates:	71.8%	74.5%	66.7%	81.0%	87.5%	90.0%	83.3%	87.5%	61.5%	66.7%	50.0%	65.5%
PROMOTED, ASSIGNED TO REMEDIAL TRAINING	6	4	1	1	0	0	2	0	0	2	1	1
Pct. of all:	0.6%	0.9%	0.3%	0.7%	0.0%	0.0%	2.8%	0.0%	0.0%	1.0%	1.1%	0.4%
Pct. of those that test promotion candidates:	5.1%	8.5%	2.4%	4.8%	0.0%	0.0%	16.7%	0.0%	0.0%	6.1%	25.0%	3.4%
OTHER	7	0	3	2	0	0	0	0	3	1	0	3
Pct. of all:	0.7%	0.0%	0.8%	1.4%	0.0%	0.0%	0.0%	0.0%	3.1%	0.5%	0.0%	1.1%
Pct. of those that test promotion candidates:	6.0%	0.0%	7.1%	9.5%	0.0%	0.0%	0.0%	0.0%	23.1%	3.0%	0.0%	10.3%
NO ANSWER	20	8	10	1	1	1	0	1	2	8	1	6
Pct. of all:	2.0%	1.8%	2.7%	0.7%	1.2%	1.4%	0.0%	0.9%	2.1%	4.0%	1.1%	2.2%
Pct. of those that test promotion candidates:	17.1%	17.0%	23.8%	4.8%	12.5%	10.0%	0.0%	12.5%	15.4%	24.2%	25.0%	20.7%

Table 4: Years of Program Operation; Cost of Testing in 1988

1988-89 APA SURVEY ON BASIC SKILLS TESTING

		ANNUAL SALES			BUSINESS CATEGORY							
	WHOLE SAMPLE	LESS THAN $50M	$50M TO $500M	MORE THAN $500M	BANKING, FINANCE, INSURANCE	EDUCATION	GOVERNMENT & MILITARY	HEALTH CARE & MEDICAL	MANUFACT., CONSUMER GOODS	MANUFACT., INDUSTRIAL GOODS	PROFESSIONAL SERVICES	OTHERS
	1005	443	364	148	86	71	72	110	97	200	92	277
YEAR IN WHICH BASIC SKILLS TESTING WAS INAUGURATED												
PRIOR TO 1970	24	8	11	4	1	3	3	4	3	3	1	6
Pct. of all:	2.4%	1.8%	3.0%	2.7%	1.2%	4.2%	4.2%	3.6%	3.1%	1.5%	1.1%	2.2%
Pct. of those that perform any testing:	7.0%	5.5%	9.1%	7.3%	2.5%	15.8%	9.4%	14.8%	11.1%	4.0%	3.2%	6.4%
1970 TO 1979	45	16	18	9	3	3	7	2	2	7	6	15
Pct. of all:	4.5%	3.6%	4.9%	6.1%	3.5%	4.2%	9.7%	1.8%	2.1%	3.5%	6.5%	5.4%
Pct. of those that perform any testing:	13.0%	11.0%	13.2%	16.4%	7.5%	15.8%	21.9%	7.4%	7.4%	9.3%	19.4%	16.0%
1980 TO 1984	75	31	24	16	11	2	6	7	5	18	2	19
Pct. of all:	7.5%	7.0%	6.6%	10.8%	12.8%	2.8%	8.3%	6.4%	5.2%	9.0%	2.2%	6.9%
Pct. of those that perform any testing:	21.7%	21.2%	19.8%	29.1%	27.5%	10.5%	18.8%	25.9%	18.5%	24.0%	22.6%	20.2%
1985 TO 1988	103	49	39	9	11	3	4	8	11	31	8	27
Pct. of all:	10.2%	11.1%	10.7%	6.1%	12.8%	4.2%	5.6%	7.3%	11.3%	15.5%	8.7%	9.7%
Pct. of those that perform any testing:	29.9%	33.6%	32.2%	16.4%	27.5%	15.8%	12.5%	29.6%	40.7%	41.3%	25.8%	28.7%
COST OF BASIC SKILLS TESTING IN 1988												
Less than $1000	34	13	12	7	8	2	2	4	4	3	1	10
Pct. of all:	3.4%	2.9%	3.3%	4.7%	9.3%	2.8%	2.8%	3.6%	4.1%	1.5%	1.1%	3.6%
Pct. of those that perform any testing:	9.9%	8.9%	9.9%	12.7%	20.0%	10.5%	6.3%	14.8%	14.8%	4.0%	3.2%	10.6%
$1,000 - $1,999	15	8	5	1	1	1	2	0	1	5	1	4
Pct. of all:	1.5%	1.8%	1.4%	0.7%	1.2%	1.4%	2.8%	0.0%	1.0%	2.5%	1.1%	1.4%
Pct. of those that perform any testing:	4.3%	5.5%	4.1%	1.8%	2.5%	5.3%	6.3%	0.0%	3.7%	6.7%	3.2%	4.3%
$2,000 - $4,999	13	3	8	1	1	1	1	0	1	4	0	3
Pct. of all:	1.3%	0.7%	2.2%	0.7%	1.2%	1.4%	1.4%	0.0%	1.0%	2.0%	0.0%	1.1%
Pct. of those that perform any testing:	3.8%	2.1%	6.6%	1.8%	2.5%	5.3%	3.1%	0.0%	3.7%	5.3%	0.0%	3.2%
$5,000 - $9,999	13	6	4	3	1	0	2	1	3	2	0	4
Pct. of all:	1.3%	1.4%	1.1%	2.0%	1.2%	0.0%	2.8%	0.9%	3.1%	1.0%	0.0%	1.4%
Pct. of those that perform any testing:	3.8%	4.1%	3.3%	5.5%	2.5%	0.0%	6.3%	3.7%	11.1%	2.7%	0.0%	4.3%
$10,000 - $24,999	9	1	5	3	3	1	1	0	1	3	0	0
Pct. of all:	0.9%	0.2%	1.4%	2.0%	3.5%	1.4%	1.4%	0.0%	1.0%	1.5%	0.0%	0.0%
Pct. of those that perform any testing:	2.6%	0.7%	4.1%	5.5%	7.5%	5.3%	3.1%	0.0%	3.7%	4.0%	0.0%	0.0%
$25,000 - $49,999	3	1	0	2	0	0	0	0	0	1	0	2
Pct. of all:	0.3%	0.2%	0.0%	1.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.7%
Pct. of those that perform any testing:	0.9%	0.7%	0.0%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	2.1%
$50,000 or more	5	2	1	2	0	1	1	1	0	0	0	2
Pct. of all:	0.5%	0.5%	0.3%	1.4%	0.0%	1.4%	1.4%	0.9%	0.0%	0.0%	0.0%	0.7%
Pct. of those that perform any testing:	1.4%	1.4%	0.8%	3.6%	0.0%	5.3%	3.1%	3.7%	0.0%	0.0%	0.0%	2.1%